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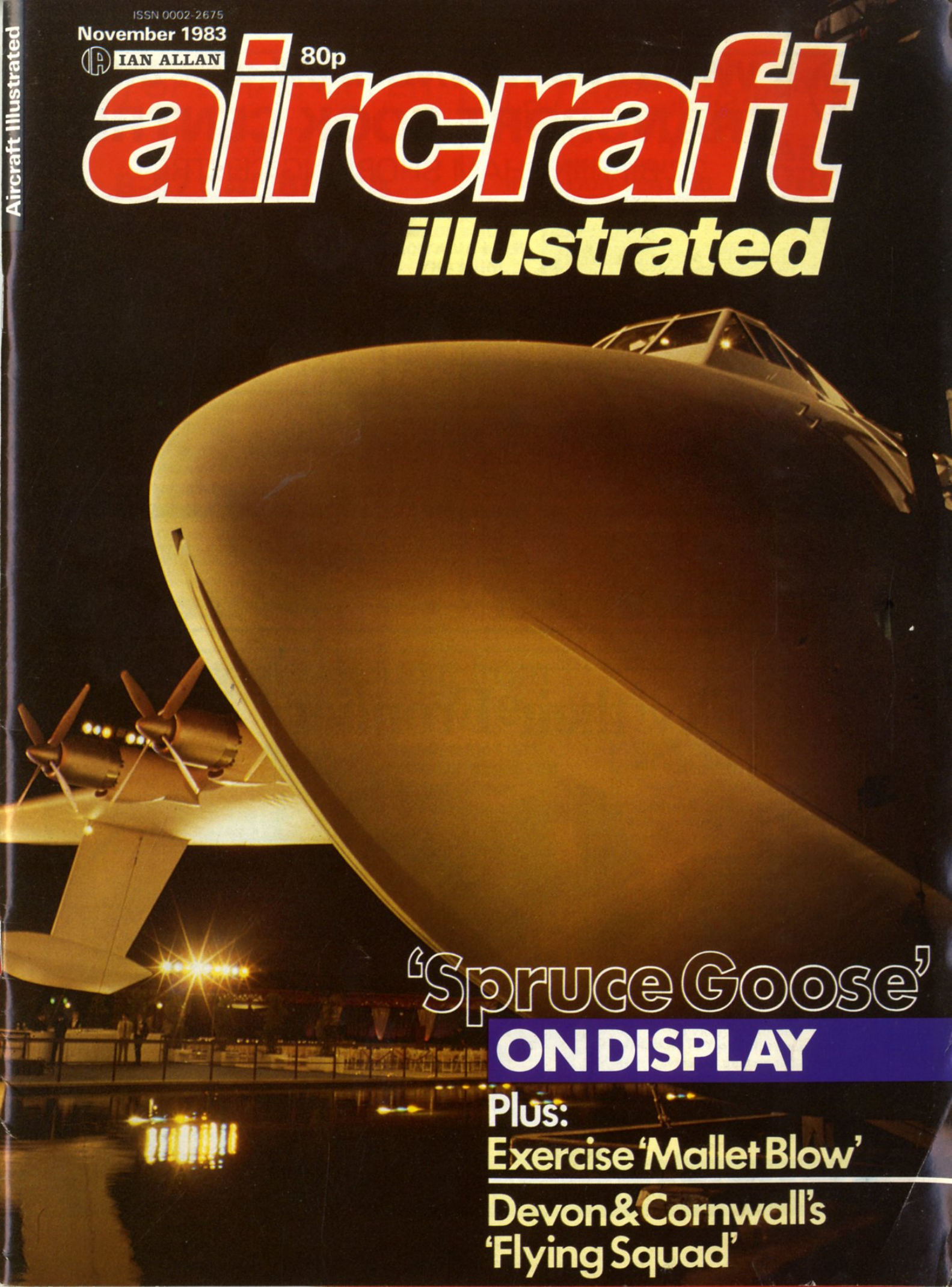
Aircraft Illustrated



'Spruce Goose' ON DISPLAY

Plus:
Exercise 'Mallet Blow'

Devon & Cornwall's 'Flying Squad'

aircraft illustrated

November 1983 Vol 16 No 11

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Cover: 'Spruce Goose' on display — Frank B. Mormillo's study of the Howard Hughes H-4 flying boat exhibited in a specially constructed aluminium dome at Long Beach Harbor, Ca (see pages 498-499, this issue).

Frontispiece: The extended-upper-deck of the Boeing 747-300 is shown to advantage in this pre-delivery photograph of the first -300 variant for UTA of France. The airline now operates two of the type (c/nos 22870 and 22871) which are both powered by General Electric CF6-50E2 engines. *Photo: Boeing*

Royal Navy Sea Harriers adorn the cover of the **1984** edition of the **Aircraft Illustrated Annual** that is on sale now. The book's content caters for all aviation interests and articles in this volume feature such varied topics as: RAF Germany, the Imperial War Museum at Duxford, The McDonnell Douglas DC-9, 'the noble "Nine-Ack" ' and 'Build it yourself'. The Annual is available at an unchanged price on last year's edition — **£3.95**

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airscan

Paul Humphreys

IF there's one word which can sum up the principal aim of air transport operations that word just has to be 'safety'. That means safety both in the air and on the ground; and so often, it seems, the safety of aircraft in flight is placed in jeopardy by the failure of people and equipment on the ground to do their job. But more of that later. Immediately the Zagreb disaster springs to mind, as do others associated with Innsbruck, Ermenonville, the Canaries, Jan Smuts — the list is long.

It would be wrong to assume that, because big international airports are big international airports, they are all kitted out with every super-modern aid to operating aircraft, that all their runways are long enough, strong enough and pointing in the right direction and that top level, long experienced, air traffic controllers, security and ground support staff are beavering away, the clock around, every day of the year. As the song says 'It ain't necessarily so'. Recently a total of no less than five West German airports were graded as 'deficient' by the International Federation of Air Line Pilots Association. In addition IATA despatched a delegation, led by its Technical Director, to Nigeria to assess the level of basic safety facilities at airports in that country following complaints from a number of major airlines that these facilities are not available there.

In springing to their own defence the various West German airports invoked a whole clutch of capital letters — AACC, IATA, ICAO. Some airports have almost insurmountable terrain hazards, such as a river close to Bremen airport which needs to be diverted, and a glideslope for one Saarbrucken airport runway which, while it is within approved limits, is kinked owing to local geographical problems. This latter airport was graded as 'seriously deficient'.

In Nigeria the lack of search and rescue services, an electrical power supply which produces variations in runway lighting intensity and landing aids, plus insufficient security facilities for aircraft and cargo has caused IFALPA to issue a warning that a 'black star' will be applied to all Nigerian airports. This means that if the reported deficiencies are not made good before the Association's delegation makes a tour of inspection, international pilots will refuse to take aircraft into Nigeria.

Adding insult to potential injury IATA airlines have been regularly charged landing and other fees as if all the required services had been provided. Which they had not. If there's a sure way to make an airline angry it is to hit it where it hurts most — in the wallet. Hence the string of complaints about Nigeria and its Aviation Ministry.

For those of us who, without taking too much thought about things of this kind, happily strap-in to a Jumbo and wing off to West Germany or Nigeria, it's a comfort to know that the experts concealed behind all those capital letters are looking after the safety interests of their members and of us, the fare-paying passengers.

Nor yet a drop to drink

A recent announcement by the Federal Government of Canada concerning the purchase of a fleet of 23 bomber aircraft referred to ' . . . additional air attack capabilities'. For a moment or three I was nonplussed. Was Canada preparing to launch an aerial blitzkrieg?

The announcement related to the joint purchase by the Federal Government and some of the Canadian Provinces, of Canadair CL215 water-bombers, the flying fire-engines. Apart from the fact that these specialised aeroplanes will provide 'additional air attack capabilities', they will help the Provinces with their protection programmes and improve and maintain Canada's overall forest fire suppression capability. During the past four years more than 58,000 square miles of productive forest was burned; thus a large and effective fleet of water-bombers is essential to Canada's forest products industry. But there is an additional important benefit springing from this order which is part of the Canadian Special Recovery Projects programme. It means 180 million Canadian dollars worth of business for aircraft and equipment manufacturers in four Provinces and the creation of around 800 jobs at Canadair and other companies. If only British Aerospace could land an order for 23 BAe 146s. What a shot in the arm it would be for so many suppliers and sub-contractors in the UK.

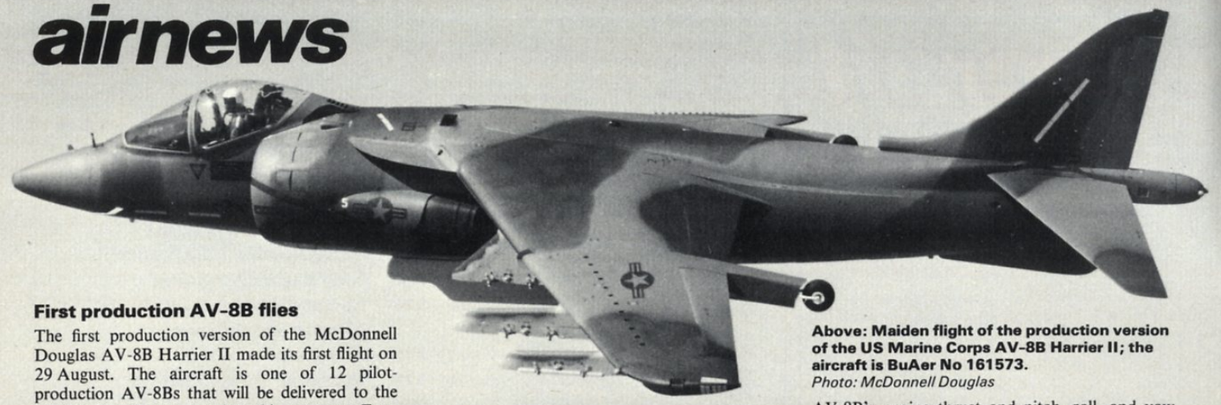
Soviet aggression for all to see

As this piece is being written comes the first confused news of the Soviet fighter attack on and destruction of the Korean Airlines 747 which came down in the sea north of the Kamchatka Peninsula. It is inevitable that, in any event involving the Soviet military, their reports and comments are at variance with those emanating from other sources, particularly the United States. Hence the confusion. However, nations around the world have condemned this act of aerial piracy and whatever the reason which caused the passenger-laden civil airliner to fly for such a long period through Soviet airspace, its destruction by Su-15 'Flagons' armed with Anab heat-seeking missiles was wholly unjustified and unnecessary.

If reports are to be believed, only minutes before it crashed Korean Airlines Flight 007 was in radio contact with air traffic controllers at Tokyo's Narita airport. Transcripts of the last few minutes' exchanges between them and the aircraft captain were published but at no time during the long period when the Soviet fighters were 'trying to give assistance in directing the 747 to the nearest airfield' does there appear to have been any general call from the captain on the international distress frequency. Clearly, sophisticated US intelligence-gathering equipment, including satellites, monitored the 747's flightpath and the attendant fighters and there is no evidence — at the time of writing — that the US intercepted any distress calls.

This single outrageous act by the Soviet Union possibly has done more to set back West-East relations than any since the building of the Berlin Wall.

airnews



First production AV-8B flies

The first production version of the McDonnell Douglas AV-8B Harrier II made its first flight on 29 August. The aircraft is one of 12 pilot-production AV-8Bs that will be delivered to the US Marine Corps, starting this autumn. Four other AV-8Bs have been built for a full-scale development programme and are being used for flight testing.

With McDonnell Douglas Test Pilot Jack Jackson, at the controls the new AV-8B took off from Lambert-St Louis International Airport for a one-hour test flight. Following a conventional take-off, Jackson and flight test engineers monitored the AV-8B's handling qualities and weapons systems. After a short landing, Jackson made a vertical take-off, hovered for several minutes and made a vertical landing. The AV-8B's engine thrust and pitch, roll, and yaw stability were tested.

Above: Maiden flight of the production version of the US Marine Corps AV-8B Harrier II; the aircraft is BuAer No 161573.
Photo: McDonnell Douglas

The first AV-8B US Marine Corps squadron is scheduled to become fully operational in 1985. In US Marine service, the AV-8B will replace five squadrons of McDonnell Douglas A-4 Skyhawk aircraft, and three squadrons of AV-8A Harriers.

BA leases 737s

British Airways has finally announced a replacement for its ageing Trident fleet, although its order for 14 Boeing 737-200s will only be 'on a short-term lease basis under arrangements to be made with a group of bankers'. While this agreement frees the airline from a long-term commitment on a Trident replacement, BA's decision to also secure options on an additional 17 Boeing 737-200s is a pointer to its future planning.

British Airways had for some time been studying possible replacement aircraft, including the 737, the DC-9 srs 90 (MD-90) and, with an eye to the future, the proposed Airbus Industrie A320.

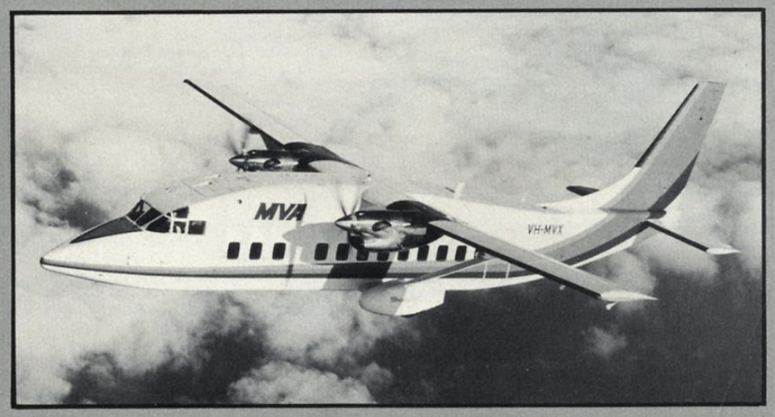
Deliveries of the 14 leased aircraft will begin in late-1984 through to 1985 with the 737s on option scheduled for dates in 1985 and 1986. The new 'Baby Boeings' will be used on BA's shuttle routes and major destinations on the continent.

Boeing offers 747 'mod'

An upper-deck modification for standard passenger 747s now in service is being offered by Boeing to increase the capacity of the aircraft by up to 44 seats. The modification would give 747-200s an extended upper deck and relocated stairway similar to that of the 747-300, the new version which entered service in March. All 747s are candidates for modification except freighter and convertible versions, both of which have hinged noses for cargo loading.

The modification would entail removal of existing upper fuselage from just aft of the flightdeck windows to a point directly above the aft edge of the wing root, and replacing it with three new upper fuselage sections. Other changes required would include doing away with the spiral stairway opposite the forward passenger entry door and installing a straight stairway opposite the second entry door, installing a new ceiling throughout the interior, and providing on either side of the upper deck a Type A door equal in width to the main-deck doors.

Current schedules call for the modification programme to begin in September 1984 (subject to 20-firm orders), with two 747s under modification at any one time. Each aircraft would be out of service from 10 to 12 weeks.



Right: The first of three Shorts 360 regional airliners (VH-MVX) for Murray Valley Airlines of Victoria, Australia photographed shortly after take-off from Belfast on 2 September on the first stage of its delivery flight.
Photo: Short Brothers

Navy Lynx 3 announced

Westland has announced the development of a new variant of the Lynx helicopter, designated Navy Lynx 3. It is designed, says the manufacturer, to 'maintain Lynx superiority over the ever increasing surface and submarine threat, advancing the capabilities of Navy Lynx with the most modern weapons and sensors'.

Weighing in at 12,000lb (5,445kg), Navy Lynx 3 will carry an impressive array of weapons and sensors — including active and passive sonobuoys, dunking sonar, magnetic anomaly detector and 360° radar — and provides an increase in range and time on station.

Armament will include the new Stingray, Mk46 and Mk44 torpedoes and depth charges. Sea Skua anti-ship missiles will be carried and the helicopter will be able to defend itself with Stinger air-to-air missiles or 20mm cannon.

The multi-role tasks of the Navy Lynx 3 will comprise anti-surface vessel strike, anti-submarine warfare, electronic surveillance measures, search and rescue as well as casualty evacuation; Navy Lynx will also carry nine equipped troops when used in the troop transport role.

Rolls-Royce news

The latest version of the Rolls-Royce 535 engine for the Boeing 757 twinjet has made its first flight in a Boeing 747 test bed aircraft. The 535E4 engine flew on 17 August from the Boeing flight test centre in Seattle for a 'shake-down' flight which lasted 1¼ hours.

The 535E4 is being developed to power Boeing 757 aircraft for delivery from late 1984. The engine provides 40,100lb take-off thrust and will reduce the aircraft's fuel consumption for short haul operation by an estimated 15% compared with the 535C engines currently installed. The 535E4 is on schedule for certification in December this year. Production engine deliveries to Boeing will begin in December, and the first flight of a Boeing 757 with 535E4 engines is scheduled for early next year.

● Rolls-Royce reports it is making 'excellent progress' with the new Tay turbofan which is being developed for the latest Gulfstream Aerospace executive jet, the Gulfstream IV. The new Tay, says the manufacturer, provides a 15% improvement in fuel efficiency over the earlier Spey which powers the Gulfstream III, as well as increased thrust and low engine noise levels.

Major design work on the new engine is now complete and manufacture of the first components for pre-production engines has begun. The Tay is scheduled to make its first run in August next year and certification is planned for July 1986. Take-off thrust rating of the Tay is 13,500lb, but for the Gulfstream IV it will be operated at 12,450lb thrust flat rated to 95°F.

Right: The Nigerian Police Air Wing has taken delivery of two Bell Model 412s (one of which [5N-AQS] is illustrated) and two Bell 222Bs from Bell Helicopter Textron.
Photo: Bell Helicopters

Tornado Operational Evaluation Unit formed

The Tornado Operational Evaluation Unit was opened formally on 1 September 1983 by the Deputy C-in-C RAF Strike Command, AM Sir Peter Bairsto, at the Aeroplane and Armament Experimental Establishment, Boscombe Down, Wilts. Its role will be to ensure the best operational use of the Tornado GR1 as a complete weapons system by developing tactics, evaluating weapons and improving accuracy by day and by night in all weathers. Trials will be conducted in electronic warfare, tactics, terrain following radar operations and weapons delivery. There will be close liaison between the unit and RAF Tornado squadrons, with the Operational Research Branch at RAF Strike Command and the Aeroplane and Armament Experimental Establishment for detailed analysis of trials results.

This is the first time in more than 25 years that the RAF has established a unit specifically for the purpose of developing the operational role of a strike/attack aircraft and is a recognition of the importance of Tornado to the RAF and its contribution to the NATO Alliance.

The Tornado Operational Evaluation Unit will have a complement of four Tornado GR1s and will be commanded by Wg Cdr J. G. Lumsden, with a staff of two flying crews, two tactics officers and supporting ground crew. It will be an RAF Strike Command unit controlled by the Central Tactics and Trials Organisation and it will be a lodger unit at Boscombe Down. Initially it will be established for a period of two years.

The RAF will operate 220 Tornado GR1s, the strike/attack version and a further 165 Tornado F2s, the air defence variant.

'Tangential Carriage' F-15s

The US Air Force has tested a McDonnell Douglas F-15 Eagle modification that can extend the operating radius with large external weapons loads up to 40%, depending on its configuration. The modification to the F-15 involves an attachment of weapons on the F-15's conformal fuel tanks. These tanks are aerodynamically shaped devices that 'hug' each side of the fuselage and add 9,000lb (1,385 gals) of fuel to the aircraft. The weapons are attached to rows of stub pylons on the lower corner and bottom of the conformal tanks. For mission payloads of many weapons, the stub pylons replace conventional multiple racks. The racks cause more drag and use external fuel stations, both of which limit the aircraft's range.

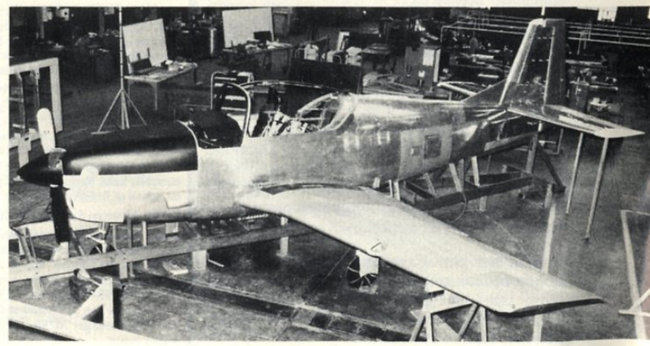
The modified F-15 flew for the first time on 18 August at the US Air Force Flight Test Center at Edwards AFB, Ca. The design is known as 'Tangential Carriage' and up to 12 1,000lb (453.6kg) bombs or four 2,000lb (907.2kg) bombs can be accommodated on the stubs.

Turboprop trainers

Below: Firecracker Aircraft (UK) Ltd unveiled its new NDN-1T turboprop Firecracker trainer in early September. The aircraft, registered G-SFTR, was flown on its maiden flight by Desmond Norman, the aircraft's designer and vice chairman of Firecracker Aircraft and Sqn Ldr John Davy managing director of Specialist Flying Training, the type's first customer. The private-venture Firecracker is the only flying British contender for the RAF's Jet Provost replacement, a role for which it has been specifically designed says the manufacturer.
Photo: Firecracker Aircraft

Right: One of the Firecracker's competitors for the RAF contract is the Pilatus PC-7 Turbo-Trainer. The PC-7 received its FAA Type Certification in August and the first US-registered example, N701RB, has been delivered to Bertea Aviation. *Photo: Pilatus*

Below right: A full-size engineering mock-up of the RAAF's new basic pilot training aircraft. The mock-up of the side-by-side trainer is intended to allow the RAAF and the prime contractor, Australian Aircraft Consortium, to check installation details and maintenance features. Roll-out of the first prototype is planned for December 1984 with first flight scheduled for February 1985. *Photo: AAC*



airnotes

● The **SA365N Dauphin** (naval version) has completed its deck-landing qualification test series. With support from the French Navy, a production search and rescue (SAR) machine made more than 150 offshore sorties — off the coast of Brest — with deck-landings on the missile-launching frigate *De Grasse* and the escort *Duperré*. The landings were made in headwinds of up to 90kph, crosswinds of 56kph and with the ship rolling at angles approaching 12° and pitching at 4°. Several of the missions were carried out by US Coast Guard pilots; the service has 90 SA366G Dauphins on order.

● A **BAe125 srs 800** has been ordered by Consolidated Contractors Co Ltd (CCC) for delivery in the latter half of 1984. CCC is based in the Middle East and a major consideration in the purchase was the srs 800's ability to fly from London-Kuwait non-stop. This is the third sale of a srs 800 which is the latest version of the BAe 125 (see *Sept 83*).

● **McDonnell Douglas** has delivered another KC-10 tanker/cargo aircraft to the US Air Force, the first of 44 of the type ordered under a multi-year procurement programme. The example is the 17th to join the fleet which has compiled more than 16,000 flight hours in the first 2½ years of operation.

● Two specially-equipped **Dornier 128-6** and **228-100** aircraft are to be provided for the German Antarctic Expedition following successful snow and ice trials in Greenland. The aircraft are to be operated in the south polar region from the end of this year under a research programme funded by the Federal Ministry of Research and Technology. The Dornier's task will be to carry the team of German scientists further into the interior of the Antarctic, and to achieve this the aircraft have been fitted with a wheel-and-ski landing gear to enable take-offs and landings to be made on snow and ice strips.

● The **US Navy** recently expanded its electronic warfare force by forming a new EA-6B Prowler squadron at NAS Whidbey Island, Wa. The unit, VAQ-139, is nicknamed the 'Cougars' and is the US Navy's tenth Tactical Electronic Warfare Squadron.

● **Panther Pacific Corporation** and the Independent American Group have jointly purchased five Aérospatiale Dauphins, which will be operated by Panther Pacific for offshore operations on the Gulf and Pacific coasts.

● An agreement for the purchase of a second batch of 75 **F-16 Fighting Falcons** has finally been signed between Israel and General Dynamics. It has also been reported that Turkey has signed for 160 F-16s of which 120 will be built under licence.

● The last production **L1011 TriStar** rolled-off the Lockheed assembly line at Palmdale on 20 August. Although 250 TriStars have been built over its 14 year programme life, the total falls short of the manufacturer's 300-aircraft break-even point. The decision by Lockheed to close the TriStar production was taken on 7 December 1981 (see *Feb 82*, p54) with the reasons given as 'a lack of orders and the inability to project with confidence a timely and adequate upturn in the commercial aircraft market.'

● The first two **Casa/Nurtanio CN-235** twin-turboprop commuter and utility transports were rolled out simultaneously on 10 September at Casa's Getafe facility in Spain and Nurtanio's Bandung factory in Indonesia.

RAF accident reports

Jet Provost T4, XP564

Date: 22 April 1982 *Parent Airfield:* RAF Brawdy, Dyfed *Place of Accident:* Nant-Y-Moch Reservoir, nr Aberystwyth *Crew:* Two pilots *Casualties:* One injured

Circumstances: On 22 April 1982 an instructor and his student took off in Jet Provost XP564 for a low-level familiarisation sortie. Mid-way through the sortie the student, who was flying the aircraft, selected full throttle to maintain minimum separation distance from rising ground. The engine did not respond to the throttle selection but remained at its previous setting of 80-86%. The instructor took control, continued to climb and used his throttle to select full power. The engine still did not respond and the instructor, suspecting a flame-out, pressed the relight button for a few seconds before realising that the engine rpm was steady, indicating that the engine had not flamed out. Over-fuelling was therefore suspected and the instructor closed the throttle and lowered the aircraft's nose. The engine responded to this selection and the rpm reduced to 50% where it remained in spite of further relight attempts and in spite of exercising both throttles over their full range. The aircraft was by now descending towards the surface of Nant-Y-Moch reservoir and so, pausing only to make a 'Mayday' call, the crew ejected. The ejections were successful and both pilots were rescued from the reservoir a short time later by SAR helicopters. The instructor sustained back injuries during the ejection, while the student was uninjured though suffered mild hypothermia. Meanwhile the aircraft had crashed and sank in the reservoir.

Cause: XP564 was recovered from the reservoir and it was quickly apparent that the throttle cable between the student's throttle and the engine had failed adjacent to a pulley on the cockpit floor. As the throttle cable should form a continuous loop joining both throttles to each other and to the engine control, the failure in the student's cable had prevented the engine power from being increased. However, as the part of the loop between the instructor's throttle and the engine was still intact, closure of the throttle was still possible. Further investigation revealed that the throttle cable had been routed over the pulley guard instead of round the pulley, and that the majority of the wire in the cable had failed in fatigue; this is the typical mode of failure of a cable being operated over too small a radius. It was therefore concluded that the throttle cable had been incorrectly installed round the pulley guard instead of round the pulley. Movement of the throttles had overstressed the cable wires which broke one by one until the student's selection of full throttle broke the remaining few wires and the cable parted.

Subsequent Actions: Subsequent disciplinary and administrative action has been taken against the service personnel involved.

Jaguar GR1, XX820

Date: 11 June 1982 *Parent Airfield:* RAF Bruggen, Germany *Place of Accident:* 1Km East of RAF Bruggen *Crew:* One pilot *Casualties:* Nil

Circumstances: The pilot of XX820 was flying as No 3 and deputy leader of a formation of four Jaguars on a training sortie. Worsening weather precluded completion of the sortie as planned and the formation returned to their base as two independent elements. The first pair landed after a normal visual rejoin by the formation; the pilot of XX820 overshot from his first approach to fly a second circuit but his wingman landed. During his second circuit, while he was turning on to his final approach path, the pilot heard a rapid banging and the aircraft began to sink rapidly. He levelled the wings, but on seeing some buildings ahead he delayed his ejection in order to turn his aircraft towards open ground; he then ejected. XX820 crashed through the edge of a wood into a field and was destroyed; the pilot was uninjured.

Cause: From an initial examination of the wreckage it was determined that, whereas the left hand engine appeared to have been functioning normally up to the moment of impact with the trees, the right hand engine had virtually stopped and had suffered severe internal overheating. Furthermore, clear witness marks indicated that a threaded metallic object had been ingested by the engine. Detailed examination by the manufacturer confirmed that a countersunk-headed bolt had been ingested while the engine was rotating at high speed, and that the resultant damage to the compressor had caused the engine to surge, and then to stop in the course of the last few seconds of the aircraft's flight. The dimensions and the material specification of the bolt closely matched those of the bolts which are used in several areas of the aircraft fuselage forward of the intakes and which also secure the hinges of the intake auxiliary air doors. A modification which replaced the original bolts securing the hinges of the auxiliary air doors with a slightly different type had been embodied during a routine servicing of the aircraft; the accident occurred on the first flight following that servicing. Although it was not possible to determine conclusively the origin of the bolt which caused the engine damage it was considered most likely that, when the modification was being embodied, one of the bolts which had been removed had been left in the intake and had lodged there until final stage of the flight.

Subsequent Actions: Instructions which cover intake inspections have been revised and those describing loose articles prevention and search procedures have been amplified.

Hunter T7, XL593

Date: 5 August 1982 *Parent Airfield:* RAF Brawdy, Dyfed *Place of Accident:* 4½ miles NW of Carmarthen *Crew:* Two pilots *Casualties:* Nil

Circumstances: The Captain of Hunter XL593 was an instructor on the staff of the Tactical Weapons Unit (TWU) based at RAF Brawdy. His student was undergoing a short refresher flying course and was in the left hand seat practicing low-level manoeuvring. Some 15min after take-off both pilots noticed the onset of a high frequency vibration which persisted for about 2sec. On checking the engine instruments, the pilots noticed that the Jet Pipe Temperature (JPT) gauge indicated above full scale deflection and that the oil pressure gauge showed a very low reading. The instructor took control, initiated a climbing turn towards the nearest suitable airfield, and transmitted an emergency call. Diagnosing an engine surge, he closed the throttle but the JPT indication remained abnormally high. The instructor then told the student to close down the engine and to relight it when the JPT had decreased. The student did so, and the engine was restarted when the JPT had fallen to 400°C. At this stage the aircraft was in a shallow descent, passing a height of 4,000ft, with an airspeed of 190kts. The instructor slowly advanced the throttle, and this action produced an RPM of 5,500 with a normal oil pressure indication. However, the JPT rapidly exceeded 600°C and thrust was insufficient to maintain height. The instructor transmitted a 'Mayday' call, warning of a likely imminent abandonment, and then moved the throttle further forward. The JPT again increased to over 800°C but there was no noticeable increase in thrust and the instructor, abandoning his attempt to reach an airfield, turned the aircraft towards the coastline now visible to the south. The student once more closed down and relit the engine but the result was the same as before. The instructor then checked that the throttle was closed and instructed the student to operate the fuel pump isolate switch in order to override the automatic fuel control system. There was no improvement in engine performance so the instructor, in a final attempt to regain power, opened the throttle fully. Again there was no increase in thrust, so descending through about 1,500ft, the instructor ordered the student to eject. On seeing the student's seat fire he initiated his own ejection. Both pilots parachuted to safety while the aircraft crashed in open farmland.

Cause: An initial examination of the wreckage at the crash site indicated that an in-flight mechanical failure in the engine had occurred. This diagnosis was confirmed during a subsequent strip examination by the manufacturer, who found that a first stage compressor blade had become detached from the rotor; part of the blade had been ingested by the engine, causing extensive secondary damage to the remaining compressor stages and resulting in severe overheat damage to the turbine. The temporary low oil pressure indication was attributed to the effect of high frequency vibration on the oil pressure transmitter. It was concluded that in the circumstances, the pilots had been powerless to prevent the loss of the aircraft; indeed, it was recognised that they had displayed commendable skill and airmanship in coping with the emergency.

Subsequent Actions: The rotor blade failure has been attributed to metal fatigue. The Service engineering authority is collaborating with the manufacturer to determine whether any remedial action is necessary to prevent further similar failures.

Jaguar GR1, XX760

Date: 13 September 1982 *Parent Airfield:* RAF Bruggen, Germany *Place of Accident:* 10 miles North West of Dornoch, Scotland *Crew:* One pilot *Casualties:* Nil

Circumstances: Jaguar XX760 was one of a number of aircraft which were detached to RAF Lossiemouth for an exercise. On the morning of 13 September 1982, it took off from Lossiemouth in the lead of a six-aircraft formation. The formation completed an attack on Tain weapons range and were flying above Northern Scotland when the warning alarm of XX760 sounded and the No 2 engine fire warning light illuminated. The pilot shut down the engine, pressed the fire extinguisher button, and transmitted to the other members of the formation that he had an engine fire indication; they confirmed that the rear of his aircraft was indeed on fire. When the pilot next looked at his warning panel he saw that the No 2 engine fire warning light had extinguished but that all the other fire warning captions had illuminated. After further confirmation from both his rear view mirror and the rest of the formation that the aircraft was still on fire, the pilot transmitted his intention to eject and did so at about 1,200ft. The aircraft, still on fire, continued in a gradually steepening dive until it impacted in open moorland. The pilot landed uninjured and was subsequently rescued by helicopter.

Cause: There had been a fracture in the Combustion Chamber Outer Casing of the No 2 engine which had allowed engine gases, at an estimated temperature of above 1,600°C, to penetrate into the engine bay in a concentrated jet. The gases had then burnt through the titanium keel structure and the floor of one of the fuselage fuel tanks. Released fuel had flowed rearwards through the engine bay and was ignited by contact with hot elements of the engine nozzles. The pilot had ejected when the fire was confirmed and attempts to extinguish it had failed.

Subsequent Action: Following the accident, an inspection and modification programme was introduced on the aft section of the Combustion Chamber Outer Casings, and in June 1983 the RAF received the first of a new interim standard of casings.

Airliner Orders

Airline	Aircraft	No	Ordered	Delivery date
Air Botswana	Dornier 228-100	1	m-83	m-84
Bar Harbor Airlines*	Beechcraft 1900	10	10 Aug 83	c-Jan 84-m-84
Birmingham Executive Airways*	BAe Jetstream 31	1	1 Sep 83	n.d.
British Airways*	Boeing 737-200	14-le/f	2 Sep 83	c-l-84-85
	Boeing 737-200	17-le/o	2 Sep 83	1985-86
ERA Helicopters	Bell 222UT	2	17 Aug 83	Oct 83
Japan Air Lines*	Boeing 747SR	1	1 Sep 83	Dec 84
	Boeing 747-300	2	1 Sep 83	Dec 84 & Jan 85
LTS*	Boeing 757	2-f	25 Aug 83	Jun 84 & e-85
	Boeing 757	1-o	25 Aug 83	n.d.
McAlpine Aviation*	BAe Jetstream 31	1	1 Sep 83	1984
Piedmont Airlines	Fokker F28 Mk 1000	12-f 8-o	25 Aug 83 25 Aug 83	c-Feb 84 n.d.
Qantas*	Boeing 747-300	3	7 Sep 83	(see notes)
	Boeing 767-200	6	7 Sep 83	(see notes)
Skywest Airlines*	BAe Jetstream 31	3	24 Aug 83	c-Jan 84
Texas Air*	MD-82	11	16 Aug 83	1984-85
‡Thai Airways International*	Boeing 767	(–2)	(see notes)	n/a
US Air*	Boeing 737-200	5	31 Aug 83	l-84
	Boeing 737-300	10c/o	31 Aug 83	l-85-m-86
Vee Neal Airlines*	BAe Jetstream 31	6-f 4-o	1 Sep 83 1 Sep 83	(see notes)

Airliner Orders

Bar Harbor Airlines: The first customer for the new Beechcraft 1900 Airliner twin-engine turboprop. Value of the order, which includes crew and maintenance training and spare parts is in excess of $25million. The 1900s will join Bar Harbor's fleet of Convair 600 and Beech 99 airlines, which currently operate out of the company's Bangor, Maine base on routes extending to Presque Isle, Maine in the north, New York City in the south and Albany, NY in the west.

Birmingham Executive Airways: A third Jetstream 31 for BEA to augment its existing fleet of two aircraft. This aircraft will be used on Birmingham Executive's scheduled air network which currently links Birmingham with Copenhagen and Zurich and, on behalf of British Airways, to Aberdeen.

British Airways: See 'airnews' item, this issue.

Japan Air Lines: The order, worth about $290 million, brings the number of 747s purchased by JAL to 52, making it the world's largest 'Jumbo' operator. The airline's 383-seat extended-upper-deck models are scheduled for delivery in December 1984 and January 1985 and will operate on Tokyo-Los Angeles/San Francisco and Tokyo-London/Paris routes. The 550-passenger 747SR will be used on domestic routes within Japan.

LTS: (*Lufttransport Süd*) The new Munich-based airline will use the Rolls-Royce-powered 757s on chartered services next summer linking Munich to the Mediterranean and the Canary Islands, with occasional longer-haul flights to more distant holiday destinations. Value of the order with spare parts and training is more than $85 million and the purchase brings total 757 firm orders to 129.

McAlpine Aviation: A third 'green' Jetstream 31 for 1984 delivery to add to its previous order for two aircraft (see *Aug 83*, p344).

Qantas: Deliveries of the 747 aircraft — first -300s ordered by Qantas — are scheduled for November 1984 and January and April 1985. Qantas will receive two of the first 767ERs in October 1985, with other deliveries scheduled between December 1985 and March 1986. Engine selections and passenger configurations will be announced at a later date.

Skywest Airlines: This order marks the first Jetstream 31 sale in Australia and Skywest, Australia's largest third-level airline, will use the '31s' to replace older aircraft on an extensive route network linking Perth with some 20 cities and towns in the State. The contract is valued, with spares, at over £5 million.

Texas Air: In addition to this order, New York Air (a subsidiary of Texas Air) announced in July 83 that it was leasing two MD-80 aircraft, one of which will be leased on a short term basis and returned to McDonnell Douglas in early 1985. As of 1 August, there was a backlog of 56 firm orders for MD-80s, along with 20 additional aircraft being built for short-term lease. McDonnell Douglas has conditional orders and options for an additional 74 MD-80s.

Thai Airways International: Believed to be the cancellation of the two aircraft order placed on 30 Sep 82 (see *Jan 83*, p9).

US Air: The airline, which was the lead customer for the 747-300, has exercised its options on the type bringing its total -300 order to 20 aircraft. At the same time US Air has ordered five more 737-200s which, when delivered, will boost its fleet of that model to 23.

Vee Neal Airlines: Pennsylvania-based Vee Neal has operated a leased Jetstream 31 between Latrobe and Raleigh-Durham and Erie and Philadelphia from 14 October. The first three Jetstream 31s will be delivered in November and December 83, replacing the leased aircraft and two Bandeirantes. The remaining three Jetstream 31s will be delivered in March, April and May 1984.

Key:

n.d.=no details, e=early, m=mid, l=late, c=commencing, f=firm, o=options, le=leased, c/o=converted options, n/a=not applicable, *=see notes.

Airliner Deliveries

Airline	Aircraft	No	Delivered	Date ordered
Air Afrique*	Airbus A300B4-100	1	12 Jul 83	21 Apl 79
Air France	Boeing 737-200	3	Apl, May & Jun 83	n.d.
American Airlines*	MD-82	4	(see notes)	25 Sep 82
	Boeing 767-200	2	Apl & May 83	15 Nov 78
All Nippon Airways*	Boeing 767	3	Apl, May & Jun 83	Sep 79
Ansett Airlines*	Boeing 767-200	3	(see notes)	Jun 83
British Airways*	Boeing 757	1	Apl 83	31 Aug 78
CAAC*	Boeing 747SP	1	Jun 83	n.d.
China Airlines*	Airbus A300B4-200	1	28 July 83	May 81
	Boeing 767	1	Jun 83	21 Mar 80
CP Air	Boeing 737	1	Apl 83	n.d.
Delta Air Lines*	Boeing 767-200	2	May & Jun 83	15 Nov 78
Eastern Air Lines	Boeing 757	3	Apl, May & Jun 83	31 Aug 78
East-West Airlines	Fokker F27 Mk 500	1	2 Sep 83	n.d.
Egyptair*	Airbus A300B4-200	1	6 Jul 83	4 May 79
Federal Express*	Boeing 727-200F	1	Jun 83	30 Sep 81
Frontier Airlines	Boeing 737-200	2	Apl & May 83	n.d.
Jambo Airlines*	Dornier 228-100	2	m-83	n.d.
Japan Air Lines	Boeing 747B	2	Jun 83	23 Jul 82
Lufthansa*	Airbus A310-200	1	7 Jul 83	2 Apl 79
	Boeing 737	1	Apl 83	n.d.
Monarch Airlines*	Boeing 757	2	Apl & May 83	Feb 81
Murray Valley Airlines*	Shorts 360	1	e-Sep 83	Jun 83
Pacific Western Airlines	Boeing 767	1	Apl 83	22 Dec 78
Piedmont Airlines	Boeing 737	4	Apl (2), May & Jun 83	n.d.
Royal Air Moroc*	Boeing 737-200C	1	Jun 83	8 Jul 82
Republic Airlines*	MD-82	1	26 Aug 83	n.d.
Singapore Airlines*	Boeing 747-300	3	Apl (1) & Jun (2) 83	15 Dec 81
South African Airways	Boeing 747-300	2	Apl & May 83	Jun 81
Southwest Airlines	Boeing 737	4	May, Apl (2) & Jun 83	6 Jan 80
TAP Air Portugal*	Boeing 737	4	Jun 83	31 Mar 82
Transbrasil Airlines	Boeing 767	1	Jun 83	30 Jul 81
Trans World Airlines*	Boeing 767	1	Apl 83	Dec 79
United Airlines*	Boeing 767	5	Apl 83	14 Jul 78
US Air	Boeing 727	1	Apl 83	30 Nov 82
	Boeing 737	3	Apl, May & Jun 83	10 Mar 81

Airliner Deliveries

Air Afrique: The Abidjan-based carrier has taken delivery of its second A300B4-200. In its two years in service Air Afrique's first A300 (see *Sep 81*, p392) has accumulated some 7,100 revenue flight hours with daily utilisation averaging 8.6hrs, the highest figure for an Airbus operator. Its average flight duration of 3.1hrs reflects its use on routes linking Africa and Europe.

American Airlines: The four MD-82s are continuing deliveries under the leasing agreement between the airline and the manufacturer (see *Sep 83*, p392). Aircraft were delivered on 1, 2, 17 and 29 August and are s/nos 1111, 1112, 1113 and 1115 respectively. The 767-200s are the carrier's fifth and sixth.

All Nippon Airways: The first 767s for the Japanese carrier.

Ansett Airlines: Three out of the four 767s that were originally intended to enter service in December 1982 and January 1983 (see *Jan 83*, p9) but whose delivery dates were deferred by the airline.

British Airways: The airline's fifth Boeing 757.

CAAC: (Civil Aviation Administration of China).

China Airlines: With this Airbus the Republic of China's national carrier has completed its four aircraft order placed in May 81. The 767 delivery also completes an order, this time for two aircraft reported in *Jun 80*, p249 — see also *Mar 83*, p106.

Delta Air Lines: Continuing deliveries under the order reported in *Jan 79*, p8.

Egyptair: The completion of the airline's eight aircraft order which began with the first delivery three years ago.

Federal Express: Delivery of the first freighter version of the -200 and also the initial aircraft in the order for 15. For more information on the order and the -200F see *Dec 81*, p537.

Jambo Airlines: A newly formed carrier based at Kano, Nigeria. A third aircraft is scheduled to be delivered late this year.

Lufthansa: The airline's sixth Airbus A310.

Monarch Airlines: The Luton-based airline now operates in service its complement of three Boeing 757s.

Murray Valley Airlines: See accompanying photo-caption and Sep 83, p392.

Royal Air Moroc: The second and final -200C in the order reported in *Sept 82*, p393 (see also *Jul 83*, p296).

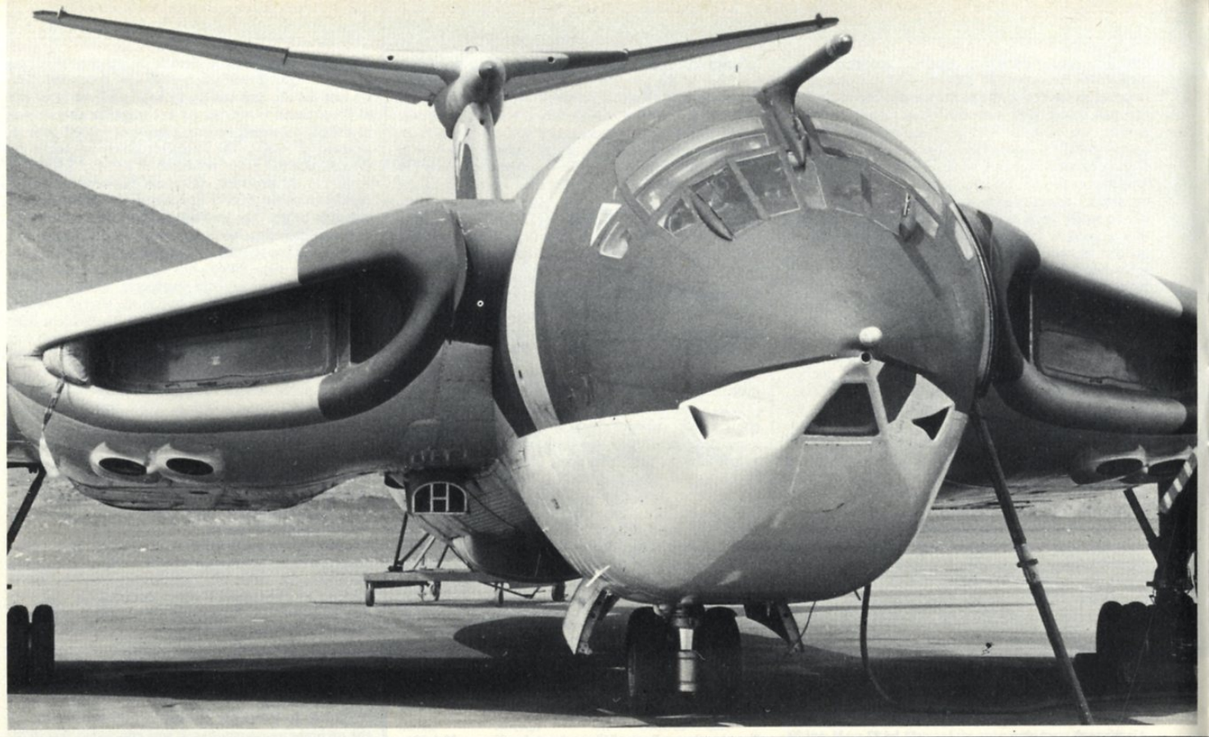
Republic Airlines: Aircraft is s/n 1062.

Singapore Airlines: See *June 83*, p250.

TAP Air Portugal: The first four in a seven aircraft order placed in Mar 82 (see *Jun 82*, p249).

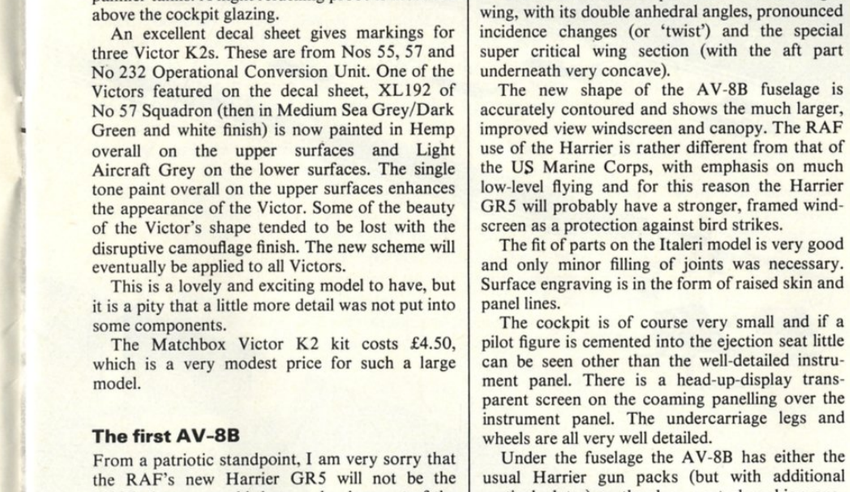
Trans World Airlines: Registered N606TW, this is the airline's sixth 767 in its order for 10.

United Airlines: Continued deliveries to the US carrier of Boeing's wide-body twin-jet.



Left: Close-up details of the real thing for modellers constructing the new Matchbox 1:72 scale Victor K2 kit. Note the subtle curves of the engine intakes, thick wing root section, bulbous forward fuselage with flight refuelling probe and the upward sweeping 'T'-tail. This aircraft, seen at Ascension Island last year, was finished in Medium Sea Grey/Dark Green/White scheme but will eventually sport Hemp overall on the upper surfaces and Light Aircraft Grey on the lower. *Photo: Allan Burney*

Below: LS Kits has released a delightful 1:72 scale model of the Pitts S-2A aerobatic biplane. Decals are provided for the now disbanded Rothmans Aerobatic Team, which are seen in this 1980 photograph. *Photo: Allan Burney*



airkits

James Goulding

The Matchbox Victor

Before making comments about the new 1:72 scale Matchbox kit of the Victor, I must say how pleasing it is to have, at last, a model of a V-bomber in this scale (albeit the tanker variant) after so many years of constantly badgering various manufacturers. There has been a clamour from modellers for kits of these impressive aircraft in 1:72 scale ever since they became well-established in Squadron service. The Victor will be the last of the V-bombers to retire from the RAF and should continue as a tanker until the end of this decade. Now, rather late in the day, modellers have been given a Victor and Vulcan in 1:72 scale; but sadly a 1:72 Valiant will probably never be produced, even though it was a very important RAF bomber and tanker.

The first of the two Victor prototypes, designed to Specification B35/46, made its first flight on 24 December 1952. This aircraft flew successfully on its test programme until July 1954, when it was totally destroyed after the tailplane broke away during low-level tests. The second prototype made its maiden flight in September of that year. The somewhat redesigned production-type Victor, with longer nose and lower-position tailplane, known as the Victor B Mk 1, first flew on 1 February 1956, and No 10 Squadron at RAF Cottesmore became operational with the new bomber in April 1958. At this time the Victor was powered by four AS Sapphire engines of 11,000lb thrust each. While the first B1s were being delivered, development of improved versions of the Victor were under way. Development of a B2 variant powered by four Rolls-Royce Conway bypass engines was favoured by the Air Ministry. The installation of Conway engines necessitated wider, deeper engine bays and larger area air intakes, resulting in an increased wing span. The changes incorporated in the Victor B2 did not improve cruising speed, but increased its high altitude capability — advantages which were to be lost when the V-bombers' role changed to low-altitude penetration. The Victor with Sapphire engines was a superb aircraft and a development with up-rated Sapphires would probably have matched the B2 performance had it not been terminated.

The Victor was in many ways the best and most advanced of the V-bombers. For many years it was the largest aircraft known to have flown at supersonic speed, having attained over Mach 1 in a shallow dive. The big bomber could cruise at speeds around Mach 0.92 and was capable of lifting very heavy bomb loads. Whereas the Valiant and Vulcan could carry 21,000lb of conventional bombs in their internal bays the Victor could stow 35,000lb of bombs (five rows of seven-bomb carriers) in its huge bomb bay. In addition to the internal load, wing panniers were also planned for the Victor. It was intended to stow a total of 76 1,000lb bombs. The big Handley Page aircraft's great weight lifting ability is put to good use in its present role of refuelling tanker.

The Victor might well have become the RAF's premier bomber but its career was bedevilled by changing requirements and political considerations. The Conservative Government of the day had a policy of merging all the companies of the Aircraft Industry into large groupings, which resulted in Hawker Siddeley Ltd, and British Aircraft Corporation as the two major fixed-wing aircraft companies. Sir Frederick Handley Page was unwilling to see the company he had built up taken over by his rivals, and the government favoured those companies which had complied with its policy. Consequently, the Victor, in spite of its superb qualities, lost favour, and the order for the RAF's new medium transport went to the Andover instead of the Handley Page military Herald. Being a high-wing layout the Herald was ideally suited to have rear loading from the existing ground angle, and was believed to be the first choice of the RAF. Handley Page Ltd tried to continue alone but reduced Victor orders, the loss of the military Herald order and the development cost of the Jetstream eventually forced the company into liquidation. Victor work was taken over by Hawker Siddeley Ltd. It is ironic that, all these years later the Jetstream is beginning to find new markets in its re-launch, and the Victor will be the last of the V-bombers to remain in service, if only in the tanker role.

The new Matchbox kit of this fine aircraft represents the Victor in its K2 form. As pleasing as it is to have this long-overdue model there are some disappointing aspects to this Matchbox product.

The general overall shape is good, with a slight reservation about the windscreen not sloping down at a steep enough angle, but the standard of moulding is not as one would have desired. The general fit of parts is of poor standard, owing in part to the rather soft plastic used and the break-down of components. The Matchbox production method of using runner frames of limited size and consequently breaking down the major parts of the airframe into smaller components means many joints have to be cemented and filled. The fuselage is an exception to the rule, because this is constructed from only a few components. Most of the fuselage consists of two halves, with the cockpit area parts. There is a short tail section housing the air brakes, which can be cemented in the closed position, or shown open with an excellent representation of the mechanism.

The cockpit is disappointingly lacking in detail. The two ejection seats and the rear fixed seats are all very simple and the central pedestal is without any engraving of instruments, nor are decals for these provided. The side-opening entrance door is a separate part.

The fit of parts on the tail unit leaves much to be desired and a lot of filling of the joints was necessary. Some filing was needed to get the tailplane to seat well into the fin fairing, and the bullet fairing in front of the tailplane/fin joint required reshaping from the totally incorrect blunt contours.

The wings suffer from being broken down into a number of components. On each side there is an inner wing, incorporating the engine bays, and an outer wing, to which the shock bodies are attached. The inner wing consists of two main parts, plus a separate component with engine fronts, which is cemented internally, and two separate flap parts. The latter could be cemented in the 'down' position. The air intake airflow guide baffles are much too clumsy and thick, and would seriously restrict airflow. The outer wings are made up from upper and lower main parts, with separate ailerons and a fill in part for the shock body or Kuchmann 'carrot'.

Surface engraving is good and the wing vortex generators are particularly convincing. The undercarriage units look very effective and have good detail. There are eight wheels on each bogie, which means a lot of fiddly painting, but the end result is impressive. There are flight refuelling drogues in three positions; under the fuselage and in each wing pack. There are also two large wing pannier tanks. A flight refuelling probe is mounted above the cockpit glazing.

An excellent decal sheet gives markings for three Victor K2s. These are from Nos 55, 57 and No 232 Operational Conversion Unit. One of the Victors featured on the decal sheet, XL192 of No 57 Squadron (then in Medium Sea Grey/Dark Green and white finish) is now painted in Hemp overall on the upper surfaces and Light Aircraft Grey on the lower surfaces. The single tone paint overall on the upper surfaces enhances the appearance of the Victor. Some of the beauty of the Victor's shape tended to be lost with the disruptive camouflage finish. The new scheme will eventually be applied to all Victors.

This is a lovely and exciting model to have, but it is a pity that a little more detail was not put into some components.

The Matchbox Victor K2 kit costs £4.50, which is a very modest price for such a large model.

The first AV-8B

From a patriotic standpoint, I am very sorry that the RAF's new Harrier GR5 will not be the British Aerospace third stage development of the Harrier GR3, but the American AV-8B. Originally, it was proposed to retrospectively fit a new, bigger wing to existing GR3s, leading eventually to the GR5 which would also have the Sea Harrier windscreen and canopy.

However, McDonnell Douglas produced the AV-8B Harrier variant, with another 'big wing' design featuring 'super critical' aerofoil section. To save costs the UK government decided to order the AV-8B for the RAF under a joint production scheme whereby British Aerospace at Kingston will produce components and assemble the aircraft destined for British squadrons. The RAF AV-8B will be known as the Harrier GR5.

The first kit of the AV-8B, in 1:72 scale, has been produced by Italeri. This is a superb model — very accurate in outline and far better than any other 1:72 scale model of a single-seat Harrier. What a pity that we haven't got a Harrier GR3 to the same standard.

This model shows to perfection the new larger wing, with its double anhedral angles, pronounced incidence changes (or 'twist') and the special super critical wing section (with the aft part underneath very concave).

The new shape of the AV-8B fuselage is accurately contoured and shows the much larger, improved view windscreen and canopy. The RAF use of the Harrier is rather different from that of the US Marine Corps, with emphasis on much low-level flying and for this reason the Harrier GR5 will probably have a stronger, framed windscreen as a protection against bird strikes.

The fit of parts on the Italeri model is very good and only minor filling of joints was necessary. Surface engraving is in the form of raised skin and panel lines.

The cockpit is of course very small and if a pilot figure is cemented into the ejection seat little can be seen other than the well-detailed instrument panel. There is a head-up-display transparent screen on the coaming panelling over the instrument panel. The undercarriage legs and wheels are all very well detailed.

Under the fuselage the AV-8B has either the usual Harrier gun packs (but with additional vertical plates) or the deep ventral cushion augmentation strakes which are fitted in place of the gun packs. These alternative components are included. The model can be fitted with either the prototype pitot boom or transparent sensor aperture.

There are three pylons under each wing. Sidewinder air-to-air missiles are carried on the outer pylons, drop tanks on the centre stations and the inner pylons have either triple bomb carriers or single rocket pods. Although not included in the kit, the RAF Harrier GR5 would probably carry cluster bombs in pairs on the inner and centre pylons, or twin rocket pods. Cluster bombs, rocket pods and RAF bombs can be found in the Airfix Hawk kit.

The decal sheet gives markings for the second prototype AV-8B in US Marine Corps markings, and British national markings. The colour chart gives markings for the RAF GR5, but these can only be theoretical and are most unlikely. The markings shown are based on early Harrier colours, whereas, unless markings change by the time the GR5 gets into service, it is likely that the Dark Green and Dark Sea Grey camouflage would be applied to both upper and lower surfaces.

Our sample of this splendid kit was kindly supplied by T&P Normanton Ltd, the distributors of Italeri kits. The AV-8B (listed as Super Harrier II) costs £2.16.

A little surprise

Quite 'out of the blue', because there wasn't any prior announcement, a most delightful little kit arrived in the post from Amerang Ltd. It is a 1:72 scale kit by LS of the Pitts S-2A aerobatic biplane. Alongside the Victor the Pitts biplane is incredibly small and has a similar wing span to the LS F-18 Hornet in 1:144 scale!

This is a lovely little model, with very clean moulding and excellent detail. The model fits together well. The cockpit has a seat, headrest and control stick and both the windscreen and complete canopy versions are included in the kit.

Detail and contouring of the model are good and there is nice representation of the effect of fabric stretched over the structure without over-emphasis.

The decal sheet gives markings for the Rothmans Aerobatic Team. Registration letters for each of the team aircraft are given on the sheet.

It would be nice if this kit were to herald the start of a series of 1:72 scale models of famous general aviation and sporting aircraft by LS. In the UK LS kits are distributed by Amerang Ltd.

Fujimi Bell 206B

Another fine kit in Fujimi's 1:48 scale range of helicopters is the Bell 206B JetRanger II.

Moulded in white plastic very cleanly and without 'flash' this is a nice model of the familiar Bell civil helicopter. The fit of parts is good, including the tricky fitting of cabin windows, which do not have clumsy and ugly rims around. Some internal cabin detail can be spoilt by the sight of a thick window rim cemented into the door or cabin wall.

External engraving of panel and skin lines and rivets is beautifully done. The cabin interior has two seats, control sticks and central instrument console, and for the latter item there are two excellent decals. The seats have furnishing detail. On the two subjects featured in the kit, two newspaper helicopters, the rear seats are not fitted, presumably to allow space for packages, but it is a pity that these were not included for other subjects. The rotor head is rather simplified but there is detail on the blades.

Two Bell 206Bs are included on the decal sheet. One is from Mainichi Newspapers and the other from Asahi Newspapers.

Our sample of this good kit was kindly supplied by Toyway Ltd and costs £2.80.

Devon & Cornwall's 'Flying Squad'

R. A. Nicholls *takes a look at the Devon & Cornwall Constabulary Helicopter Support Unit*

AIRCRAFT operation by the civil emergency services has long been taken for granted in the USA and many European countries, but to date the UK has been slow to capitalise on the advantages of aviation in public service roles.

The potential of aircraft was investigated in the UK as long ago as 1921, when the Metropolitan Police used HM Airship R33 for traffic observation around Epsom on Derby Day. Further trials involving balloons, autogyros, and fixed-wing aircraft took place up to the outbreak of war in 1939, but such trials were concerned mainly with pre-planned traffic and crowd control at major outdoor events rather than reaction to emergencies. As experience was gained, and particularly as air-to-ground communications improved, some success was achieved in a limited range of observation roles, but the machines then available left much to be desired in field of vision, minimum speed, safety margins at low altitude, and susceptibility to weather.

The development of practical helicopters and their widespread use by the military after WW2 enabled the emergency services to request assistance in situations where the use of such a machine was beneficial. Such aid was freely given when life was in danger, but in non-life-saving situations military commitments had to enjoy priority. Although this system of 'ad hoc' assistance worked tolerably well in areas close to helicopter bases, it was inevitably a poor substitute for having a machine on permanent call, while if the helicopter had some distance to travel to the incident its usefulness was partly or wholly offset by the response time. Furthermore, with the exception of the Bell 47/Westland Sioux in the observation role, military helicopters were not generally ideal for public service tasks.

As police forces in particular came to appreciate the capabilities of the helicopter and see it as a viable adjunct to certain aspects of conventional policing methods, considerable use was made of military or chartered civil machines to meet specific situations, but it was 1980 before the first permanent police helicopter unit was established in the UK. That formation, the Metropolitan Police Air Support Unit (MPASU), operates three Bell 222s within the 770 square mile Metropolitan Police District and was featured in detail in *Aircraft Illustrated*, September 1981.

While the MPASU was being planned, a provincial force in a totally dissimilar environment, and with contrasting operational requirements, was carrying out its own assessment of helicopters with a similar end in mind. That force was the Devon & Cornwall Constabulary, which is responsible for policing most of the SW peninsular of England, and some statistics might be useful here to set the scene. The D&CC serves a 4,000 square mile area, measuring 180 miles from east to west and 75 miles from north to south at its widest point, which varies between the cities of Exeter and Plymouth and the wild expanses of Dartmoor and Bodmin Moor. The resident population of 1.4 million varies widely in density of distribution, and is swelled by an annual influx of four million tourists. The coastline, approaching 500 miles in total length, is the longest of any UK police force, while the two counties are traversed by a 13,000 mile road network, over 90% of which is either 'B' Class or Unclassified. To cover this diverse area the D&CC has an establishment of 2,734 officers and a 555-strong vehicle fleet.

Below: Co-operation between 'QB99' and Mobile Policing Division crews minimises delays on the major routes carrying traffic to and from the force area.
Photo: Devon & Cornwall Constabulary

Left: Cockpit view of 'QB99' (G-PORR) with observer's position nearest. The rear of the cabin can accommodate up to four passengers in comfort. *Photo: R. A. Nicholls*

Below: 'QB99' can assist at heath fires, both in the observation role and by transporting teams of beaters to remote areas.
Photo: Devon & Cornwall Constabulary

Bottom: The Victorian parish church of St Helena provides the backdrop to G-MORR on one of the Unit's visits to Lundy Island, 11 miles off Hartland Point, North Devon.
Photo: Devon & Cornwall Constabulary

The D&CC had often received military helicopter assistance during searches for missing persons, abscondees, etc, and a good relationship existed between themselves and locally based units, but by 1978 it was felt that an independent helicopter unit under police control would ensure maximum flexibility of operation. Such a unit would be available to assist in all relevant aspects of policing, and the first step was to identify the precise requirements and thus determine the most suitable type. Some of the specific tasks involved will be mentioned later, but in general terms they fell into two categories — rapid transport and aerial observation. In view of the intended usage it was decided that to be suitable a helicopter would need the following attributes: good operational range and speed of response; substantial payload with at least four seats; good visibility from both front and rear seats; low internal and external noise levels; and low operating costs.

After studying several types, including the Bell JetRanger and Hughes 500, and visiting overseas police helicopter operators, the D&CC concluded that the French-built Aérospatiale AS350B Ecureuil (Squirrel) was the right machine, and discussions took place with Aérospatiale's UK distributors, McAlpine Helicopters Ltd, which made a Squirrel and pilot available for evaluation at the height of the 1979 holiday season. The machine was used every Friday to Sunday over a six week period in July-August, covering the times when demands on police resources were expected to be highest, and the evaluation entailed 105 hours flying throughout the force area. Many varied tasks were undertaken and much useful experience was gained for future planning. Results were encouraging, and the experiment was repeated on a larger scale in 1980 with the Squirrel available daily over the same calendar period. The machine and pilot were again provided by McAlpines, while two D&CC officers who had been trained in low-level map reading and associated skills by the Army Air Corps acted as observers.

For financial year 1981/82, following competitive tendering, a contract was awarded to Colt Executive Aviation of Staverton whereby Colt would provide a Squirrel and pilot for a continuous nine-month period; for the remaining three months the machine would be on call from base. The choice of a nine-month continuous period assumed that demand would fall to almost zero over the winter months, but that theory was disproved by the heavy snows of winter 1981/82 and in the event the Squirrel was active on 325 days of the contract period. With much of North Devon snowbound the helicopter provided the only means of transport in many areas, and in addition to other policing duties it reconnoitred blocked roads with Highways Dept officials and dropped food and medical supplies to isolated communities. The Squirrel's value for observation was demonstrated when the Highways Dept, acting on what had been seen from the air, made substantial changes to its established snow-clearing strategy.

With the Squirrel proven as a viable aid to policing in the force area, it was decided to form a permanent unit and extend Colt's contract so as to provide daily cover throughout financial year 1982/83. Eight Sergeants were drawn from the Mobile Policing Division to act as helicopter observers, experience having shown that Sergeant was the supervisory rank with which officers on the ground could most freely relate. The Mobile Policing Division is complementary to the static divisional structure and operates out of Mobile Policing Centres at Barnstaple, Bodmin, Camborne, Cullompton, Exeter, Newton Abbot, Okehampton and Plymouth — by taking one Sergeant from each the Unit

acquired a fund of local knowledge spanning the entire force area. Military assistance was invaluable in observer training, and in March 1982 the selected officers received instruction from the Royal Marines Air Squadron, then based at Coypool, Plymouth, and the RAF Chivenor-based No 22 Squadron SAR detachment. Training covered airmanship, navigation, air safety, casualty evacuation and sea survival, and was completed before the D&CC Helicopter Support Unit became fully operational on 1 April 1982. The first full year of operation was a complete success and, following competitive tendering, the contract with Colt was renewed for another two full years from April 1983.

In June this year the author was permitted to spend two days with the Helicopter Support Unit, gathering information and seeing how this bold venture works in practice. The Unit is based at the D&CC Force HQ at Middlemoor, Exeter, adjacent to the Exeter By-pass and M5 motorway. Though by no means central within the force area, Middlemoor is in the most densely populated quarter and affords quick access to the areas from which most calls for helicopter assistance emanate. Furthermore, most senior officers and specialists are Exeter-based, making the presence of the Squirrel convenient for many rapid transport tasks. The Unit is housed in a self-contained flat, an ideal arrangement which provides not only office space but also domestic accommodation; thus the pilot and observer can live-in and be on hand for a quick scramble in the event of an out-of-hours emergency. The helicopter is normally active or on call from 09.00hrs-17.00hrs in winter and 10.00hrs-18.00hrs in summer, which covers most requirements, but tasks outside normal hours can be handled where necessary.

Within the D&CC organisation the Unit comes under 'A' Dept (Preventive Policing) and is watched over by Chief Inspector Dave Sherfield, who numbers this among his duties as Staff Officer to the Assistant Chief Constable 'A'. Of the eight observers, Sgt John Truelove is permanently seconded to run the flight office while flying duties are allotted on a rota basis, each observer spending one week in eight with the Unit and the following seven on normal mobile policing duties.

The helicopter is based at Middlemoor throughout the contract period except when 100 or 300 hour inspections are due — then it returns to Staverton, 45min flying time away, and is replaced by another Colt Squirrel. G-PORR is usually assigned, being replaced by -MORR, -SORR or -JORR during servicing; whichever machine is on station it is known by the D&CC radio callsign 'QB99'. The helicopter is essentially a standard AS350B, powered by a single 641shp Turbomeca Arriel turboshaft and accommodating the pilot and up to five passengers in a wide comfortable cabin, free from pillars and other obstructions. The normal skid undercarriage is fitted, but since much of the helicopter's time is spent around the coast it also carries emergency flotation gear to cater for a forced landing on water.

In contrast with the MPASU, the amount of specialised equipment carried or available for fitment in 'QB99' is minimal, reflecting the different operational needs and the disparity in the types of terrain covered. A multi-channel VHF radio and interface unit is fitted at the front seat observer's position, giving contact on all D&CC frequencies as well as those of the other emergency services and adjoining forces. For communicating with the public on the ground, for example during traffic control tasks, a pair of 400w PA loudspeakers mounted on the rear skid struts are audible at ground level from heights in excess of 1,000ft. With the poor road system and long distances between population centres in much of the force area, it is not uncommon for 'QB99' to be first on the scene of an accident and for the crew to take charge until ground units arrive; the equipment carried therefore includes first-aid requisites, heat-retaining blankets, and a supply of warning signs. A crate of loose equipment contains topographical maps, stabilised binoculars, camera and film, pyrotechnic flares and UHF pocket radios.

'QB99' operates force-wide, and in the planning stages some 25 landing sites were negotiated at locations which the Unit could expect to visit regularly, including sites for overnight parking when necessary. These sites are used for routine visits, but in an emergency the helicopter puts down as close to the incident as is safe and practicable; all divisional stations and some patrol vehicles carry a high-visibility 'H' sign to mark a suitable site, together with emergency lighting equipment, but time is of the essence and usually the pilot will have to select a landing site from the air and act on his own initiative.

Very little capital has yet been invested in the Unit, and Middlemoor currently has no hangar accommodation or fuel supply. This latter is not a major drawback as the force area includes several military and civil airfields, and 'QB99' is never more than 13min flying time from a refuelling facility. Nearest to base is Exeter Airport, at Clyst Honiton, though this has two disadvantages in that it closes through the evening and night and also levies landing fees on refuelling aircraft — these can mount up appreciably over a period. Further afield, fuel can be uplifted without incurring such penalties at Chivenor, Manadon, Culdrose, St Mawgan and Penzance Heliport. Thus a fuel supply at base is not essential, but could add further to the Unit's independence and flexibility.

The Colt contract covers a specified number of flying hours during the two-year period, based on estimated levels of demand, so flying time is carefully husbanded and 'QB99' flies only when there is a specific job to be done. Routine patrols are not flown, though the crew may divert en route to or from an assignment so as to check out an area or feature of particular interest. Such a check may take the form of a maritime patrol along the many harbours, rivers, creeks, inlets and secluded beaches which make up the meandering coastline. The D&CC has no marine section, since to provide realistic cover would require specialised boats and crews operating out of several locations around the coast, an expensive operation and one with a slow response time. However, 'QB99' can sweep long stretches of coastline and inshore waters quickly and thoroughly, checking the security of yacht harbours, marinas, and similar high crime risk areas as well as confirming the safety and identity of craft at sea. Furthermore, 'QB99' can execute such a task at any state of the tide, and on completion can immediately switch to any other role. 'QB99' has an important deterrent role around the coast, both in the matter of thefts of or from boats and in a smuggling countermeasures guise — this may be the 20th century but smuggling is still big business, though today's contraband is more likely to be hard drugs than brandy or tobacco.

Readers who have holidayed in Devon and Cornwall will recall the large tracts of open country, the long distances between population centres, and the shortcomings of the road network west of Exeter. This is just the environment in which the helicopter can show its flexibility and cost-effectiveness to the full, and the latter was demonstrated in the case of a murder committed at

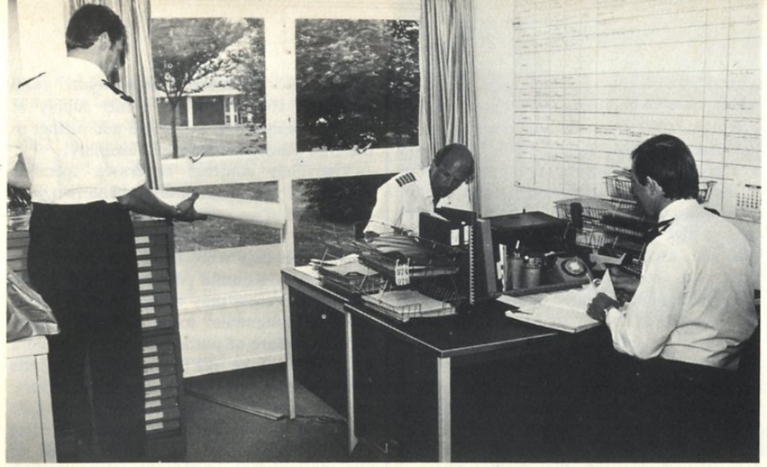
Above: The observer sprints over to check the identity of a burnt-out car, abandoned in a forest clearing and detected from 'QB99'. *Photo: Devon & Cornwall Constabulary*

Below: Exeter Airport, three miles from Middlemoor, is the Unit's nearest source of fuel — 'QB99' is normally topped-up on return from an assignment. *Photo: R. A. Nicholls*

Bottom: 'QB99' can save time and lives by evacuating casualties from secluded and otherwise inaccessible beaches at the foot of cliffs, as seen in this view. *Photo: Devon & Cornwall Constabulary*

Above: Seaton Barracks, Plymouth, 07.30hrs. 'QB99' picks-up scenes of crime officers for a photographic sortie over the scene of a double murder in the city. *Photo: R. A. Nicholls*

Left: Any clear patch of ground is a potential landing site for the Squirrel. Here 'QB99' has landed to offer assistance at the scene of an accident in a country lane. *Photo: R. A. Nicholls*



Above: Scene in the flight office as the day's paperwork is tidied up. Sgt John Gilbert (left), with Capt Mark Trumble and Sgt John Truelove. *Photo: R. A. Nicholls*

Falmouth. Firstly, 'QB99' transported senior detectives from Middlemoor, having them at Falmouth in 40min as against a road journey of over two hours. Thus the investigation was under expert guidance with minimal delay, and enquiries soon revealed a prime suspect who was detained and held on suspicion. The forensic laboratory for the D&CC is at Chepstow, Gwent, 220 miles from Falmouth on the far side of the Severn Estuary, and the case against the suspect hinged on identifying bloodstains on his clothing as coming from the victim. By using 'QB99' to fly to Chepstow with samples for forensic examination, the result was available in less time than would otherwise have been needed to even get them out of the force area. On the strength of the forensic result the suspect was charged and 100 detectives who had been drafted in on the case were either stood down or returned to other duties. Quite apart from 'QB99' having allowed the investigation to get under way quicker, with a better chance of success, the saving in overtime pay alone brought about by the accelerated conclusion more than justified its involvement on purely economic grounds.

The Squirrel's passenger capacity, speed and endurance commend it for rapid transport tasks such as those just described. An essential requirement of successful policing is quick response, and here 'QB99' comes into its own. A pathologist can be picked up from hospital or home and flown straight to the scene of a suspicious death, while special technical aids which may from time to time be needed can be delivered to Middlemoor from the Almondsbury depot, near Bristol, via the M5 in about an hour and taken on into the force area by helicopter, again saving valuable time and making ultimate success more probable. The force area includes the Scilly Isles, 30 miles off Land's End, and the helicopter is the only practicable means of liaison; the alternative is a road journey to Penzance, taking some 2½hrs from Exeter, followed by a 20min flight by scheduled BAH S61N helicopter to St Marys, subject to seats being available. If as often occurs in the summer months, the BAH service is fully booked, the other means of public transport is a three-hour crossing on the steamer *Scillonian II*, which sails once daily in each direction. 'QB99' can reach the Scillies from Middlemoor in 60min, without the restriction of timetables.

Members of the public regularly go missing on Dartmoor, either by design or accident, and 'QB99' usually plays a leading role in the ensuing search — the furthest edge of Dartmoor is within 15min flying time from Middlemoor, and the helicopter can be on the scene before the ground search is under way. In such searches a local officer is often taken aloft to act as an extra observer, providing detailed local knowledge and an additional pair of eyes — many rural beat officers have been very impressed at seeing their own 'patch' from the air for the first time, and have quickly come to appreciate the helicopter's value for observation. The crew can cover large open areas, including ditches and hedgerows, and eliminate them while directing search parties towards any features which cannot be positively cleared from the air. Where appropriate, particularly during a hunt for a fugitive, 'QB99' can carry dogs and handlers and set them down to check out likely hiding places which cannot be eliminated from the air — if the fugitive is known to be armed, marksmen can be deployed by helicopter to contain him once located. In many cases the helicopter crew can locate the missing person or fugitive quickly, with easily quantifiable savings in manpower and costs.

The Unit enjoys close co-operation with the other emergency services, and 'QB99' has provided valuable support at the scene of accidents. The long distances which ambulances have to travel, and the scarcity of comprehensive hospital facilities in the western half of the force area, can cause delays in recovering casualties, and 'QB99' can often render assistance. The rear cabin of the Squirrel can accommodate a standard stretcher, and in extreme cases the casualty can be flown directly to hospital with a doctor or ambulanceman in attendance. More frequently, however, the assistance will comprise flying medical personnel and supplies to the scene of an accident where the victim is trapped, thus allowing the best treatment to be given in situ and removing the need to extricate the victim quickly at all costs. In the case of accidents to ramblers around the coastal footpaths or on the moors, the nearest road access may be some miles from the scene. 'QB99' can either fly a doctor out or rendezvous with the ambulance and pick up one of the crew — the casualty can then receive first-aid on the spot before being airlifted out to a point where he/she can be transferred to the ambulance for the journey to hospital. How casualties are dealt with is up to the medical authorities, but 'QB99' is available to assist on request; such requests are becoming more frequent as the capability of the helicopter becomes more widely appreciated.

'QB99' is generally flown by Capt Mark Trumble, an ex-AAC pilot with wide experience of trials and demonstration flying as well as more routine helicopter operations in Northern Ireland, Cyprus, Germany, Italy and Belize. Following 10 years AAC service and a period of freelance flying, Capt Trumble joined Colt specifically for the D&CC contract and now flies almost exclusively for the Unit, finding the task most rewarding in terms of job satisfaction. Under the contract, Colt provides another pilot as necessary to cover rest days and holidays. Police operations involve much low-level flying, and it is noticeable that ex-AAC pilots take to it more readily than do those with different backgrounds.

During the author's visit 'QB99' was flown by Capt Trumble and crewed by Sgt John Gilbert, on secondment from Bodmin for his two-monthly turn on the observers' rota. As with the MPASU, flying tasks are very much a joint operation, the pilot being responsible for the safe and legal progress of the helicopter while the observer is in charge of operational aspects — in practice there is much interchange of ideas, and close interaction is the key to successful use of the helicopter.

Over populated areas 'QB99' enjoys a CAA dispensation allowing a minimum altitude of 1,000ft against the normal 1,500ft; over other areas it is free from any minimum height restriction, though 300ft is usually maintained so as to facilitate observation while avoiding disturbance of livestock. When necessary for operational reasons 'QB99' descends as low as may be required — during searches of wooded areas in particular, much can be seen by hovering below the level of the leaf canopy and looking in horizontally from outside.

As the Unit has proved its worth and gained acceptance, officers on the ground have shown a greater awareness of its capabilities and an increasing tendency to call for helicopter assistance at the start of an incident; in the early days 'QB99' was often called in only as a last resort when all else had failed. In addition to being asked for, the Unit can become involved on its own initiative. The flight office equipment includes a scanning monitor receiver covering all local radio channels, which locks on to any transmission which it finds — a suitable incident will quickly find the duty crew offering their services. Another common source of trade is the crew themselves, for whenever 'QB99' is airborne the observer is as alert to what is going on around him as any beat officer. Anything which he thinks warrants closer attention will receive it, either from 'QB99' itself or from a ground unit alerted by the crew.

At 1983 prices the cost of operating the D&CC Helicopter Support Unit is £160,000 per annum, for which the Force gets something over two hours of helicopter service daily, averaged across the year. This same sum would provide an additional four double-crewed Ford Granada patrol cars, increasing the vehicle fleet by one per 1,000 square miles of force area. Given the nature of the force area and the helicopter's speed and versatility, there is little doubt that 'QB99' represents remarkably cost-effective use of financial resources.

Over the two days that the author spent with the Unit, 'QB99' was involved in various routine and emergency tasks. Two vehicle searches in the Exeter area demonstrated how useful the helicopter is in this role; by flying against the traffic flow most vehicles can be eliminated at a glance, but if one appears to fit the description the pilot makes a 180° turn and paces it, descending to either make a positive identification or clear it and return to the search mode. Not only can moving traffic be checked, but side turnings, parking areas, etc can be scanned without missing anything on the major road. If the vehicle is located 'QB99' shadows it while vectoring ground units into position to stop it, and no amount of evasive action by the driver will cause this particular Squirrel to release its grip.

The Squirrel provides a stable camera platform, and two photographic tasks were flown. The first entailed making a film for instructing police drivers in the techniques called in to hover around Cheltenham Racecourse to assist in drying the grass, after appalling weather threatened to cancel the National Hunt Festival meeting. The treatment apparently proved quite effective! The standards set by the company, have also won a contract with the Devon & Cornwall Constabulary for two years running now, and one helicopter is on permanent detachment carrying out police work in the South West of England. A similar contract has been won for the Thames Valley Constabulary. Aerial film work can also be undertaken, a wide variety of camera mount systems being available. Despite this varied work, it is on the shorter cross country runs that the five seat helicopter's unique door-to-door convenience really scores, where a one hour 125mph flight can save three to four hours by road or train. In May 1983 a twin-engined version of the Squirrel (G-CORR) was introduced to the fleet giving the operation more flexibility in adverse weather conditions.

A surprising addition to the Colt fleet in 1981 was the ex-Strathallan Harvard G-AZBN/FT391 which the company entered in the 1982 National Air Races; it is flown by Colt pilots in their spare time to publicise the company's charter operations.

In addition to its flying activities, the company has CAA B1 Maintenance Approval for its extensive maintenance operation based at Staverton Airport. Work is carried out on the company's fixed-wing and rotary wing aircraft as well as for other organisations, and its facilities include a well equipped avionics workshop. **PRM**

Below: Immaculate Harvard G-AZBN/FT391 at Bournemouth in June 1982 for a National Air Race.

COLT

Executive Aviation

Colt Executive Aviation is a division of The Colt Car Company Limited of Cirencester, Glos, and was formed in June 1978 to fulfil the parent company's executive travel needs in the UK and Europe. The operation started with a Piper Aerostar 601P G-COLT and just one pilot. Since then, the company has expanded considerably, now operating a Beechcraft Super King Air 200 G-MCEO, a Beechcraft King Air C90 G-PTER and four Aérospatiale Squirrel helicopters G-MORR, G-PORR, G-JORR and G-SORR. The company was granted an Air Operators Certificate in November 1979, enabling all its aircraft to be available for charter work. The operation, which also acts as aircraft charter brokers and aviation consultants, is based at Staverton Airport near Cheltenham. In addition to the above it handles the role of marketing the new Mitsubishi Diamond I business jet.

Colt Cars' aviation involvement actually started some five years prior to the initiation of its own Aviation Division, with extensive use of chartered executive aircraft. The acquisition of the Piper Aerostar in 1978 quickly proved the worth of a company aircraft, and in 1979 the Aerostar was replaced by a faster and larger Rockwell Turbo Commander 690B G-JRMM, leading to the current fleet. Colt Aviation, up to this time, had also been making extensive use of helicopters, and after leasing Bell JetRanger G-BCVZ for a trial period, acquired its first Aérospatiale Squirrel.

The newest and finest addition to the Colt Fleet is the impressive Beechcraft Super King Air 200. Flown by two pilots, this pressurised aircraft offers nine seats, cruising at 300mph, at altitudes up to 30,000ft. The flightdeck carries radio navigation and autopilot equipment to airline standards. The King Air C90 is a smaller short range version of the 200 which replaced an earlier Piper Aztec (G-SATO) for UK flights.

The helicopter operation has expanded very quickly. Considerable interest was generated in 1981 when two helicopters were

Above right: In the beginning — there was the Aerostar G-COLT, shown at Henstridge in April 1978.

Right: Super King Air G-MCEO and three Squirrels on the tarmac at Staverton in January 1982.

All photos: Peter R. March

involved in escorting category 'A' prisoners; these are men who are deemed to present a particular threat to the public owing to the nature of their (alleged) crimes, and tight security is imposed when they are in transit. Such a prisoner was then on trial at Exeter Crown Court, being returned to Bristol for overnight custody as Exeter prison had reached its allowable quota of category 'A's. With the starboard door and cabin side removed, 'QB99' took a cameraman aloft for a bird's eye view of the resulting convoy as it left Exeter and headed northwards. A category 'A' convoy stops for nothing, and other vehicles are not permitted to overtake it; the manoeuvring of the front and rear escort cars as they sandwiched the personnel carrier containing the prisoner and shepherded it out from the city centre, through the suburbs and on to the M5, shows more clearly from the air than from any other vantage point.

The second photographic task stemmed from the brutal murder of two elderly ladies at Plymouth late one evening, which resulted in 'QB99' taking off and heading south at 07.00hrs the following morning. Landing at Seaton Barracks, Plymouth, just 20min later, the Squirrel picked up two Scenes of Crime officers and flew over the locality to enable them to take photographs of the scene and its surroundings. Dropping the two officers back at Seaton Barracks, 'QB99' returned to Middlemoor with the exposed film and handed it over to a mobile crew for transportation to the processing lab. Sets of prints were available at Plymouth for a briefing at 10.00hrs, and officers assigned to house-to-house enquiries had photographs to depict the areas for which they were responsible. At the time of writing the case is 'sub judice', a suspect having been charged within 48 hours.

The Unit looks set to remain as a permanent aid to policing in Devon and Cornwall, and it will be interesting to watch its development over the next few years. The cost-effectiveness of properly managed helicopter operations has been conclusively proved time and again, and it is to be hoped that increased funds may eventually be available to enable flying hours to be increased. In the longer term two helicopters would appear desirable, one based at Middlemoor and the other at a more westerly location, but for the moment the Unit is content to consolidate its present position. The D&CC is totally satisfied with both the Squirrel and the service received from Colt, and no change is likely in that area in the foreseeable future.

Such a unit could easily take on the aura of an elite formation, but that has not been allowed to happen. The Helicopter Support Unit is rightly looked on as just another means of fulfilling the Force's role as summed up in the motto under the D&CC coat of arms which appears on all vehicles, including 'QB99'. *In Auxilium Omnium* — for the assistance of all.

Acknowledgement: The author would like to record his appreciation of the help and hospitality extended by officers and civilian staff of the D&CC during the preparation of this article.

'SPRUCE GOOSE' ON DISPLAY

Frank B. Mormillo *follows-up his feature on the 'Spruce Goose' that appeared in the June 1982 issue*

AMID a great deal of fanfare, the Wrather Corporation's exhibit of Howard Hughes' controversial 'Spruce Goose' flying boat was formally opened to the public next to the RMS Queen Mary in Long Beach Harbor earlier this year.

Billed as 'the world's largest airplane', the promoters of the exhibit emphasise the fact that it would be possible to park a DC-10 airliner under each of the 400,000lb flying boat's wings. The aircraft has a 319ft 11in wingspan, an overall length of 218ft 8in and a height of 59ft 6in.

Fittingly enough, the exhibit is housed under a specially constructed $4 million aluminium dome that its builders, the Temcor Company, claim is the world's largest clear-span dome. The dome has a base diameter of 415ft, a height of 130ft, weighs approximately 654,000lb and covers 135,300 sq ft of floor space.

The flying boat, which was designated the H-4 Hercules by its builder (Howard Hughes reportedly detested the 'Spruce Goose' nickname and, in fact, the aircraft was actually built of birch), rests on an artificial lagoon that the Wrather Corporation says is in the original flight path of the aircraft's first and only flight which took place in 1947.

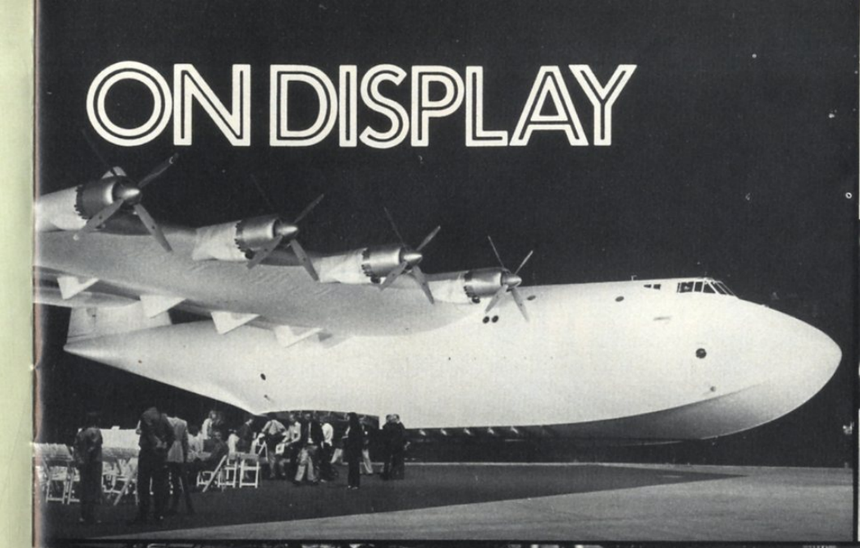
Because the dome surrounding the exhibit area allows for little natural light, the Wrather Corporation commissioned Imero Fiorentino, a New York-based lighting impresario, to illuminate the exhibit. Over 400 omni-directional lights are employed in a variety of ingenious techniques for the project. Multi-coloured lights positioned over and under the wings and beneath the lagoon produce colourful kaleidoscope effects and a succession of changes from the overhead lights give the impression of a change from day to night. The entire lighting system is computer controlled and, by altering the intensities and varying the speeds of the lighting changes, a variety of effects can be achieved — even the flying boat's engines can be made to glow red.

In order to give viewers a first hand look at the intricacies of the flying boat, a special viewing platform has been constructed and a plexiglass window installed on the left side of the aircraft's nose section which enables visitors to see the entire flightdeck. A glass 'bubble' compartment has also been constructed in the mid-section of the cargo hold to allow viewers to scan the interior of the aircraft from nose to tail.

In addition to the flying boat, a collection of aviation artifacts and Hughes memorabilia, including his leather jacket, letters, illustrations and trophies and multi-media presentations highlighting aviation history and Hughes' film and aviation exploits are also displayed under the dome. Mounted on a pylon next to the flying boat is a full-size replica of the H-1 racing plane that Hughes built to set several speed records in the 1930s. An actual Sherman tank (on loan from the 'Planes of Fame' Air Museum) is displayed near the tail of the flying boat between the original, unused clam-shell doors that Hughes had ordered for the huge cargo aircraft. A cut-away display of a Pratt and Whitney R-4360 engine, similar to the eight engines that powered 'Spruce Goose', is also on exhibit. There was even enough space under the dome to house a gift shop and a restaurant.

Opening day ceremonies for the exhibit included flybys of WW1 and WW2 aircraft, a 1929 Ford Tri-Motor transport, a Tiger Moth in RAF markings and a variety of aerobatic, light and ultra-light aircraft. The original 'Spruce Goose' flightcrew was also reunited for the event and the ribbon cutting ceremony was performed by actor and retired USAF Brig-Gen Jimmy Stewart.

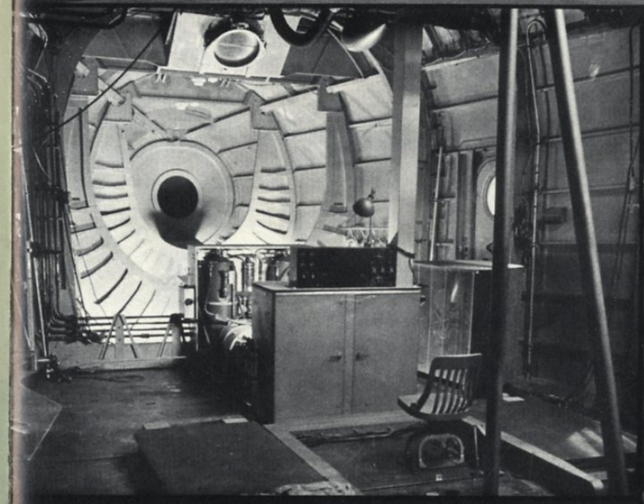
The 'Spruce Goose' is actually owned by the Aero Club of Southern California which obtained the aircraft from Hughes' Summa Corporation in July 1980. The exhibit is operated by the Wrather Corporation as a part of the Queen Mary and international Londontowne Village complex which is open to visitors, conventioneers and historians all year round in the Port of Long Beach.

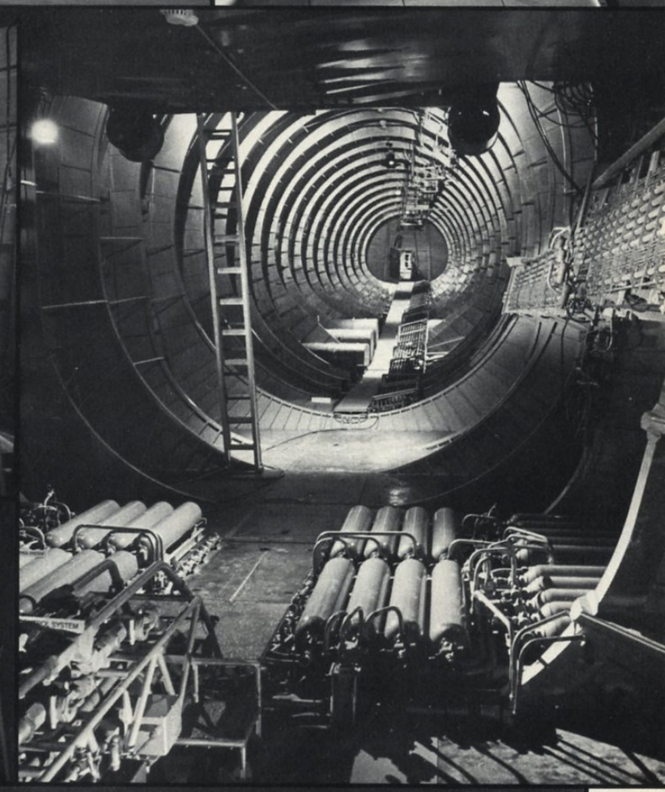


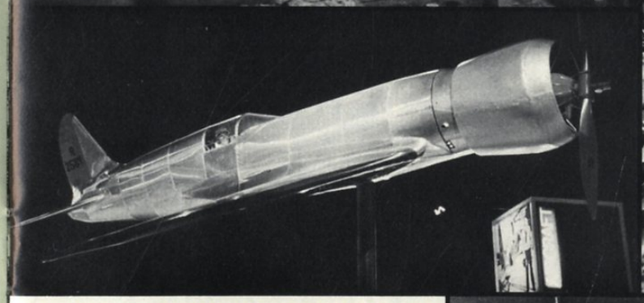
Left: The 'Spruce Goose' on display in its new home. The people in the foreground give an idea of the scale of the immense flying-boat.

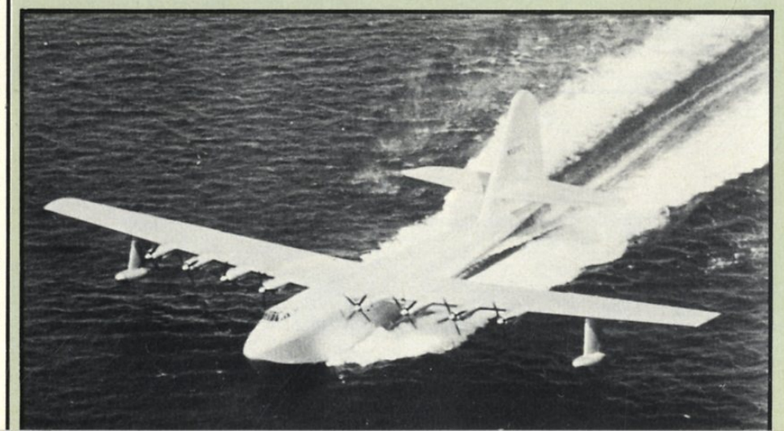
Below: A view of the 'Spruce Goose' cockpit from the observation platform that was built on the aircraft's port side.

All photos by the author unless otherwise credited









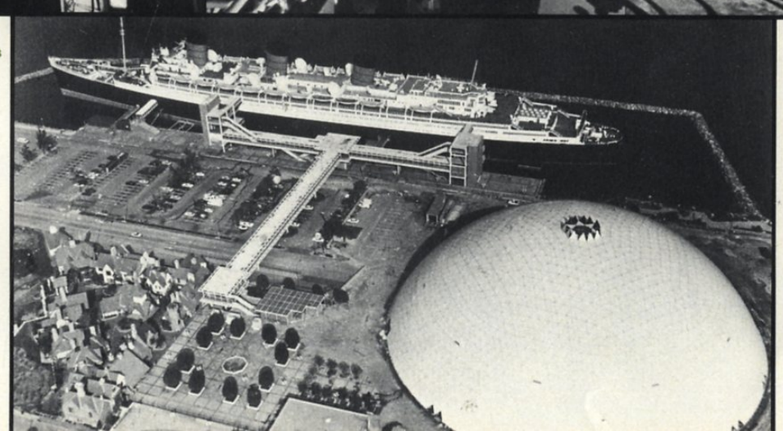
Left: Preparing for flight — the historic Hughes flying-boat, nicknamed 'Spruce Goose', took its one and only flight on 2 November 1947, when it became airborne for just one minute and achieved an altitude of 70ft. *Photo via the author*

Above centre: The views looking forward and . . .

Above right: . . . aft as seen through the glass wall in the cargo compartment observation 'bubble'.

Above: A full-size metal replica of the Hughes H-1 racing plane is displayed next to the 'Spruce Goose'.

Right: The display complex at the Port of Long Beach with the 'Spruce Goose' dome on the right and the Queen Mary. *Photo via the author*



G91Ts at Amendola

Photography by
Air-Photo Studio

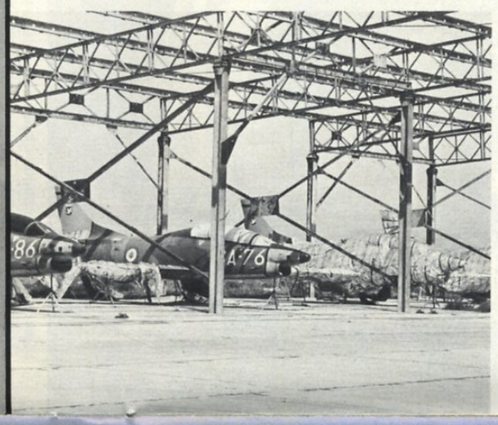
OPERATING out of Amendola-Foggia AB in Southern Italy are the G91Ts of the Italian AF *Scuola Volo Basic Avanzato Aviogetti* (Advanced Jet FTS). The tandem two-seat trainer is used to instruct students on the final stages of their training after flying MB326/MB339 in the Basic Jet FTS at Lecce-Galatina. At Amendola, the students join either *201° Gruppo* or *204° Gruppo* and fly 74 hours on the G91T, including some hours in the simulator. Having been qualified on the type, the pilots then fly a further 29 missions, including a period at Decimomannu, Sardinia for weapons training, to bring them up to operational standard.

Three Wings in Italy continue to fly the G91: *2° Stormo* at Treviso-San Angelo — G91R; *8° Stormo* at Cervia-San Giorgio — G91Y; and *32° Stormo* at Brindisi — G91Y.

The G91T was developed from the single seater by adding some 1.37m to the overall fuselage length to accommodate a second seat. The trainer retained the gun armament of the single-seater although only two 0.5in Colt-Brownings were fitted as compared with four in the G91R. The first 'T' made its maiden flight on 31 May 1960 and some 76 aircraft were delivered to the Italian AF. However, as can be seen in the photographs, a number of these are now held in storage.

Left: About to touch-down at the end of a training mission is G91T MM6371/SA71.

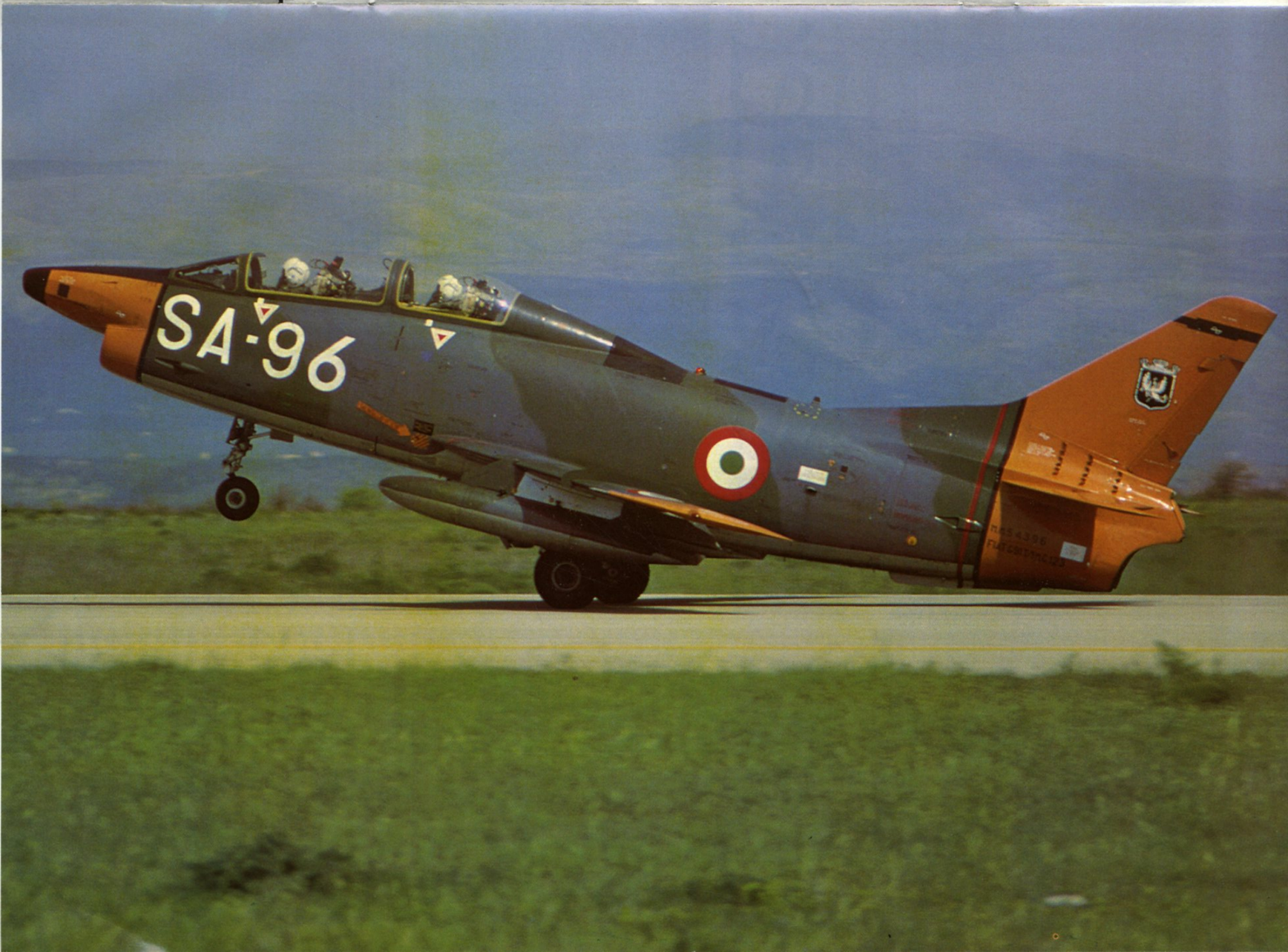
Below: Instructor and pupil aboard G91T MM6439/SA89 of the *Scuola Volo Basic Avanzato Aviogetti* (*SVBAA*) at Amendola AB in Southern Italy.



Far left: Italian AF G91Ts in open storage at Amendola. It is not known how many 'Ts' still serve with the *AMI*, but of the original 76 delivered over 15 are believed to have been written-off.

Left: One of two AB204 helicopters operated by the *SVBAA* is SA9.

Below: G91T MM54396/SA96 demonstrates aerodynamic braking during its landing roll at Amendola AB.



The four-ship formation. Three of the four aircraft —/B, /A and /K — carry the same armament fit of an ALQ101-10 ECM pod on the port outer pylon, with an AIM-9G Sidewinder on the starboard outer. Aircraft /H (second from right) has CBLS practice bomb carriers on both outboard wing pylons; for the range attacks which were part of this mission on 27 June, all aircraft carried CBLS dispensers in the internal bomb bay.

RAFG News

Buccaneer Farewell

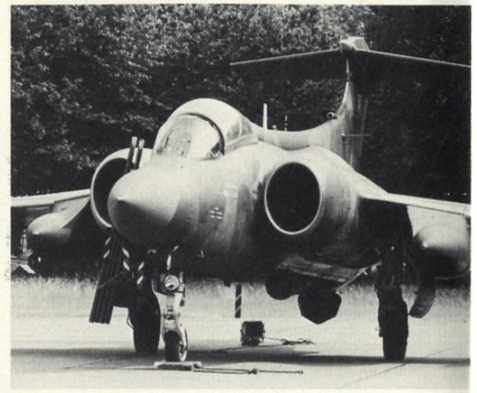
Photo-report by **Denis J. Calvert/ Inter-Air Press**

AFTER a dozen years' service with RAF Germany, the Buccaneer is nearing the end of its time. Only two RAFG squadrons have flown the type — No XV which reformed in 1970, and No 16 which replaced its Canberras with Buccaneers in 1972. Initial equipment for both units was the batch of 43 'new-build' Buccaneer S2B ordered for the RAF in 1968 after many years of indecision. Up until this time, the Buccaneer had only been used by the Fleet Air Arm and the South African AF, although the Spey-powered S2 variant had first flown as long ago as 1963. Today, the Laarbruch Wing also has a number of ex-Fleet Air Arm aircraft on strength, but these have been brought up to a common equipment standard.

Although it is an ageing aircraft, the Buccaneer is the most effective interdictor in RAFG service, and will remain so until replaced by the Tornado. Its avionics fit may be 'dated', but its airframe is optimised for the low-level strike/attack role in which it is employed from Laarbruch, and it has the undoubted affection of its crews. 'Flying fast in a Buccaneer is great — but at low speed it's a pig' was one pilot's fond comment.

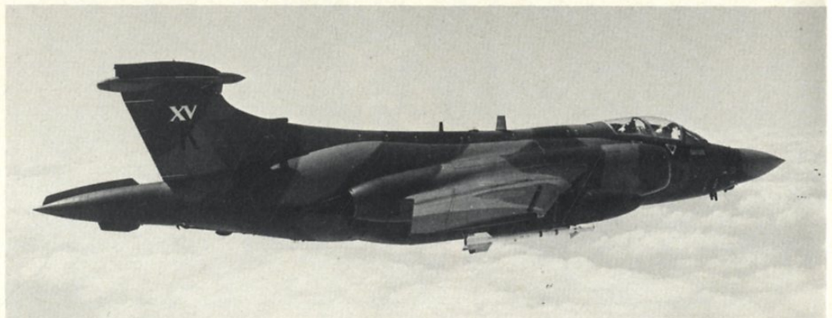
Laarbruch now only has one Buccaneer unit, No XV Squadron having amalgamated with No 16 to form a large single squadron prior to the Tornado re-equipment programme. The combined squadron — titled No 16 and commanded by No XV's 'boss' Wg Cdr E. R. Cox — will keep up the NATO commitment of aircraft on behalf of both squadrons during the changeover period. The Tornado-equipped XV Squadron will receive the squadron standard on 31 October, and will be at full strength on the new type by 1 January 1984. On this date, No 16 will start its Tornado conversion at Laarbruch, with the Buccaneer element continuing until full squadron strength on Tornado is achieved by the end of April 1984. At this point, the Buccaneer will phase out of the RAFG inventory, but will continue in RAF service. The Buccaneers so released will return to the UK, to be given an avionics rework and to be made compatible with the Sea Eagle anti-shipping missile before re-roled to UK-based maritime attack.

The accompanying photographs were taken on a range mission from Laarbruch on 27 June, just days before the squadron amalgamation. Four XV Squadron Buccaneers were put up, along with a photographic aircraft, on a mission to the Vlieland air-to-ground range off the Dutch coast. Each aircraft was to make a number of passes on the range, dropping CBLS bomblets on to the target on the sand. There was obviously a salutary effect in having a photographer in the back seat of one of the aircraft, as an unusually high number of direct hits were recorded.



Above left: The nose badgework on XT287/F *MacRobert's Reply*. The original *MacRobert's Reply* was a Stirling B1 given by Lady MacRobert in memory of her three sons, two of whom were RAF pilots killed in action in May and June 1941. The Stirling bore the same MacRobert family crest and flew 12 operational missions with XV Squadron. Its captain for most of these missions was Flg Off Peter Boggis. The same Peter Boggis, now Sqn Ldr (retd) had the opportunity a year ago to unveil the same family crest on the XV Squadron Buccaneer.

Above right: The distinctive shape of a XV Squadron Buccaneer, with weapons bay door opened to reveal a CBLS. This store, much used in peacetime training on air-ground ranges, contains 6lb 'bomblets', whose ballistic characteristics resemble those of full-sized bombs.



Below: A Buccaneer behind the barbed wire fortifications of its HAS at RAF Laarbruch. HASs of the type built in the 1970s on RAFG bases are capable of arming, fuelling and the turnaround of a single Buccaneer, although two Buccaneers can be physically accommodated with wings folded.

Below centre: The second Buccaneer squadron to be based at Laarbruch, and now the second to re-equip with Tornado, is No 16, whose somewhat more colourful badgework adorns this S2. The 'cross keys' emblem on the intake duct comes from the squadron badge, and indicates the unit's origins as an army co-operation squadron (the keys symbolise the unlocking and disclosing of the enemy's location and secrets). No 16 Squadron will have flown the Buccaneer for over 11 years in RAFG when it starts its conversion to Tornado at the beginning of 1984.

Bottom: 'Before the official photographer came'; an informal squadron photograph, posed in front of a XV Squadron Buccaneer S2 on 27 June this year, just days before the amalgamation of this squadron with No 16. The aircraft in the background is S2 XT287/F *MacRobert's Reply*.

Left: Descending through the clouds, /K of XV Squadron. The Buccaneer is — at least until the advent of the Tornado — RAFG's most potent interdictor, with a range which could take it well into East Germany or Poland. RAFG Buccaneers are not fitted with a nose mounted flight refuelling probe, but a near-standard underwing load is of two conformal fuel tanks on the inboard pylons. In addition, the weapons bay door contains an integral fuel tank with a capacity of 3,500lb. Buccaneer crews need to keep up proficiency in low-level flying, as in a 'hot' situation in Central Europe, flying at around 100ft would be the aircraft's best chance of getting through to its target. Peacetime training is only cleared down to 250ft in NW Europe although parts of the Highland restricted area in Scotland can be used down to 100ft on special authority. Training down to 100ft is important for pre-exercise work-ups, and would be absolutely essential in wartime.

Colour centrespread, overleaf

Left: Since the late-1970s, RAF tactical aircraft have been camouflaged overall and the roundels reduced to the red/blue type only. In this view of four XV Squadron aircraft, only the white AIM-9G Sidewinder AAMs and the white 'XV' squadron number on the fin appear to compromise an otherwise very effective camouflage scheme.

Right: Nearly 30 years have elapsed since the Hunter first entered service with the RAF and although its great days have long since gone it continues to be useful in a variety of roles, one of which is to provide transition training for pilots going on to the Buccaneer. This job was thrust on to the two-seat Hunter T7 because no training version of the Buccaneer was ever built and there are certain techniques which pilots need to practise before climbing into its cockpit for the first time. Possibly the most important of these concerns the landing. The Buccaneer, like all aircraft designed for carrier operation, must be landed without flare. The Buccaneer requires a constant angle of attack on landing and the optimum angle corresponds with a threshold speed of 132kts plus two knots for every 1,000lb of fuel. To help pilots get the right angle there is a sensor, the Airstream Direction Detector (ADD), a short metal tube sticking out of the side of the fuselage which measures the difference in air pressure between top and bottom surfaces, works out the incidence and passes the information to the pilot, visually through an instrument in the dashboard and aurally through a tone in his headset. The ADD is one of a number of instruments which have been put into the two-seat Hunter to give it some semblance of a Buccaneer. The others are strip speed indicator — in which the display is horizontal instead of the more usual circular — altimeter and compass which also contains navigational TACAN and Instrument Landing System displays. Together they are known as the Integrated Flight Instrumentation System. Hence the nickname by which the T7 is known in the squadrons, the IFIS Hunter. Photographed at low-level by RAFG PR Photographer Barry Ellson, is a Buccaneer of XV Squadron with IFIS Hunter WV318 based at RAF Laarbruch.


XV


XV
WV318

CHINOOKS and the JHSU

Story by **RAF Germany,** *photographs by* **Barry Ellson** *unless otherwise credited*

PERSONNEL at RAF Gutersloh have been learning to stay clear of the station's latest inhabitants — the Chinook helicopters of No 18 Squadron. Living up to its name, which to North American Indians was a warm wind, the downdraught from the Chinook's two 60ft diameter rotor blades creates a wind of more than 40mph up to 70ft away when the helicopter is hovering just above the ground. And the Army too has sometimes had to recover its tents from a neighbouring hedge after a visit from a Chinook.

No 18 Squadron is a part of RAF Germany within the Second Allied Tactical Air Force. Its role is to support 1 British Corps of British Army of the Rhine and it does this by transporting troops, freight and, if required, evacuating casualties. Freight can be carried internally or slung from the belly of the aircraft externally. Three cargo hooks are fitted, the centre capable of lifting 12 tons and the other two nine tons each. A complete Rapier team can be lifted at once, the fire unit and towing Land-Rover slung underneath and another Land-Rover and trailer with the missiles and the crew loaded inside. In the casualty evacuation role 24 stretchers can be carried.

This huge increase in tactical airlift capability that is taking place as No 18 Squadron works up to its full complement of Chinook helicopters means that a corresponding effort has to be made on the ground to make the maximum advantage of the opportunity. A helicopter that can lift 11,000kg in one go without even landing, requires men who know how to select the landing sites, prepare the loads and ensure they are properly rigged for safe and secure transport.

Until now some of this specialist knowledge has been supplied by the Mobile Air Operations Teams, three of which are operated by RAF Germany through the Helicopter Support Squadron at RAF Gutersloh, but they have been reinforced by a new unit specially formed to bring in Army participation more directly, the Joint Helicopter Support Unit. Occupying the old German canteen premises at Gutersloh, it is commanded by Capt Mike Lanham of the Royal Corps of Transport who spent two years as an air despatcher at Lyneham and later returned there as ops captain of No 47 Air Despatch Squadron. With this background he was a natural for the task of forming two inter-service helicopter support units, one in the UK, the other in Germany.

The units are staffed by one-third air force and two-thirds army personnel and have a total strength of 56. However half of them are retained in the UK in deference to overseas manpower ceiling restrictions.

Their peacetime job is to enhance helicopter loading work, which in practice is mainly concerned with underslung loads, and to help with internal loading. They travel round First British Corps and RAF Germany to assist local units with their training by providing a nucleus of skill and experience. The official description of their role is the selection, preparation, marking and management of landing sites by day and night; reception, inspection and preparation of loads; aircraft marshalling; hooking up loads; planning internal loads and securing them under aircrew supervision; and the provision of specialist advice. They are also responsible for the control of resupply fuel tankers.

Capt Lanham said most loads were underslung for convenience, to avoid the necessity of the helicopter landing and the time and trouble needed to get the equipment inside the aircraft. 'However if a long distance is involved it's better to load the equipment internally because you can fly faster and therefore make up the time you spent in loading it. Paradoxically, at the other end if you are anywhere near the enemy and you have to land and take time in unloading you put yourself at more risk. So the variations on a theme require some management skill, what risks you are taking and what is the gain.'

Underslung loads are usually carried in nets containing equipment stacked on standard NATO pallets to an average weight of 1,000kg. The maximum number of pallets that can be carried is 12 although such loads tend to weigh out before they bulk out. Slings are used for what are known as cleared loads — Land-Rovers, trailers, mobile diggers and the Combat Reconnaissance Vehicle Tracked range — for which rigging schemes have been worked out in advance by the

Right: The Chinook can carry up to 11,000kg of freight externally using its three underfuselage cargo hooks.

Right: Blindfire unit and one-ton truck slung under a Chinook. *Photo: Geoff Card*

Below: Members of the Joint Helicopter Support Unit co-operate with No 63 Squadron, RAF Regiment, Gutersloh as a Rapier fire unit is readied for an airlift by a No 18 Squadron Chinook. *Photo: Geoff Card*

Joint Air Transport Establishment. 'But when you get into operations the rule book tends to go by the board,' says Capt Lanham. 'There were many examples in the Falklands when junior ranks were bundled out of a helicopter, shown a bit of field equipment they had never seen before and told to go and rig it.' It showed the amount of responsibility that could be accepted by their SACs and Corporals using their basic training and knowledge of rigging, making up for what they didn't know by common sense.

The Chinook's three hooks can be used for ferrying equipment to three different sites in turn without the complete load having to be taken off each time, a very useful flexibility but it does require careful management at the loading point, said Capt Lanham. 'The sheer management problems, especially at night, of putting the right load in the right net on the aircraft that's going to the right landing point in the right order for unhooking takes some doing. And in the chaos of the fog of war it will not be easier.'

In war the unit would probably deploy by road to a prepared site such as a dump by a main supply route, or by air to an emergency site where the helicopters would be required to restore a critical situation like a bridge destroyed or railway line blocked. In this case the need would be paramount for a proficient team who could keep a short-range 'shuttlecock' service going.

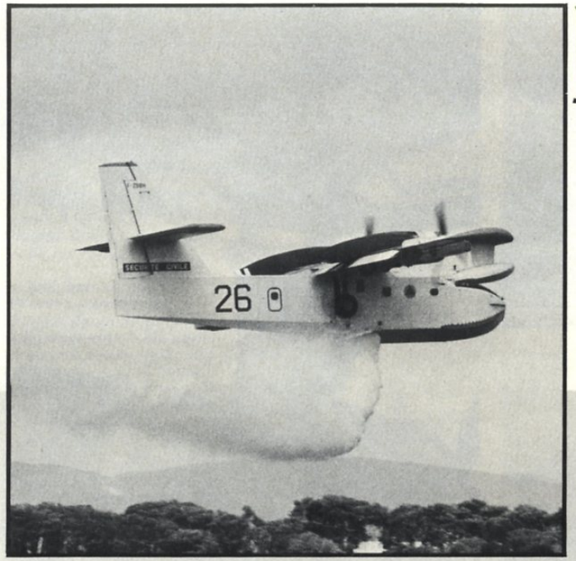
One future employment option for Chinook would be over longer distances to support the 6th Brigade's air mobility concept in which troops and equipment could be rapidly moved to any area of the First British Corps sector which was threatened. As far as its troop carrying capacity is concerned the Chinook again demonstrated its ruggedness in the Falklands. From experience there it is known that it can take off with up to 80 men crammed into its hold. Its normal peace-time complement is 30 troops with their equipment or 44 passengers seated.

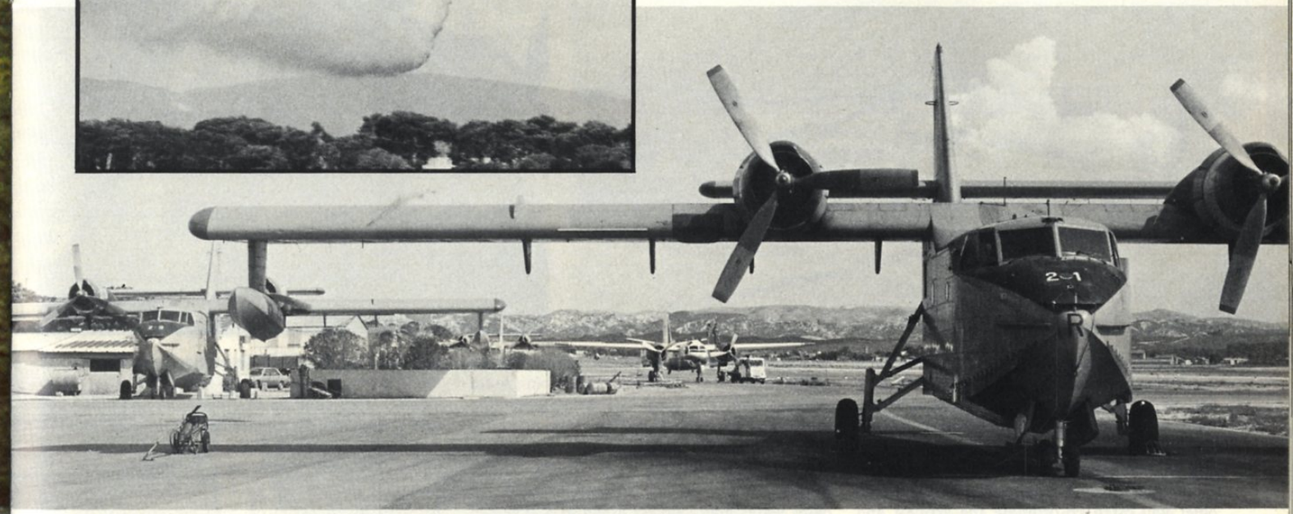
The Chinook has a normal range of 350 miles but, for ferrying, extra fuel tanks can be fitted in the cargo space and the range increases to 1,000 miles. Maximum speed is 160kts. Along with its neighbours, the Puma helicopters of No 230 Squadron and the Harriers of Nos 3 and 4 Squadrons, No 18 regularly practises deployment away from RAF Gutersloh into the field. The squadron also maintains a detachment of aircraft and personnel in the Falklands.

No 18 Squadron is no stranger to RAF Gutersloh. It operated Dakotas from there during the Berlin Airlift and was resident from 1970 to 1980 with Wessex helicopters. Now commanded by Wg Cdr Tony Stables, who has had three previous tours with the squadron, it returned to Gutersloh in May this year.

Left: A Land-Rover and trailer carrying Rapier missiles emerges from the fuselage after the Chinook has already deposited the fire unit and towing vehicle.

Water-bombing the French Riviera





David Oliver

THE big twin-engined bomber made a steep diving turn before levelling off at tree-top height to begin its run over the target which was surrounded by smoke and flames. However the bomb load carried by this 'attacking' aircraft is designed to put out the fire, rather than to add to it. The 'bomber' in question was one of France's *Sécurité Civile* Air Group of fire-fighting water-bombers that are a familiar sight to many holiday-makers in the South of France during the hot dry summer months.

The *Sécurité Civile* was formed in 1954 by the French Ministry of the Interior when Lt Col Curie, a Paris Fire Chief, was put in command of a flight of Bell 47Gs crewed by ex-military pilots, with their main role being fire-spotting and the transport of urgent medical supplies. In the 1960s the Bells were replaced by a total of 26 Alouette IIIs which at present operate from 18 permanent and two temporary bases situated around the country mainly in coastal and mountain areas where they are called on to carry out missions such as: search and rescue, casualty evacuation, traffic accident assistance and light-house support as well as fire-watching under the control of the local Provincial Governments.

In 1969, a Canso Catalina water-bomber was acquired from Canada and evaluated by the *Sécurité Civile* which decided that there was an urgent requirement for such an aircraft as a useful weapon in its fight against the devastating forest fires that regularly broke out during the summer months, often in areas that were totally inaccessible to ground fire-fighting units. Its experience with the Catalina led the *Sécurité Civile* to become the first customer for the Canadair CL215, an amphibian designed from the outset as a water-bomber and which incorporated many design features specified by the French. A total of 12 CL215s was subsequently delivered to the Air Group's fixed-wing base at Marseille's Marignane Airport beginning in 1970 and was soon found to be the ideal machine for the job.

Since then, four Douglas DC-6 airliners have joined the Air Group after being converted by UTA Industries at Le Bourget, to drop 11,360 litre of water or chemical retardents from a belly tank which is divided into eight compartments. However, the DC-6 has the disadvantage of having to return to a suitably large airfield, often some distance from the scene of the fire, to refill its tanks and as a result its time between drops can prove longer than is ideal. Also, when fully loaded, the veteran Douglas is not particularly manoeuvrable so its main function is now to 'bomb' trees in the path of an oncoming fire to form a wet barrier.

The latest type to be acquired by the unit is the Grumman S2F-1 Tracker, with three of these ex-anti-submarine aircraft being purchased from Comair of Canada in June 1982, and three more from the US a year later. The Trackers are used to patrol danger areas during the high risk periods and are usually the first aircraft to 'attack' an outbreak dropping 3,400 litre of water from the four tanks built into its torpedo bay. They will then call out the Canadairs and remain

Top: One of the *Sécurité Civile's* CL215s dropping 5,500 litre of water in a little over one second.

Above: Two *Sécurité Civile* Canadair CL215 water-bombers on the apron at Marignane, with one of the unit's Grumman Trackers in the background.

Top left: Two *Sécurité Civile* CL215 water-bombers (F-ZBDD/24 [left] and F-ZBBW/47) taxi-in at Marignane at the conclusion of a mission; note the slightly different colour schemes of the two aircraft.

Left: 'Pellican 46' skimming across Lake Salagou at a speed of 70kts. It takes 10sec for the aircraft to scoop up enough water to fill its 5,500litre tanks.

All photos by the author

Far left, top: Six Grumman Trackers have been converted into water-bombers for use by the *Sécurité Civile*, including F-ZBAZ/T1.

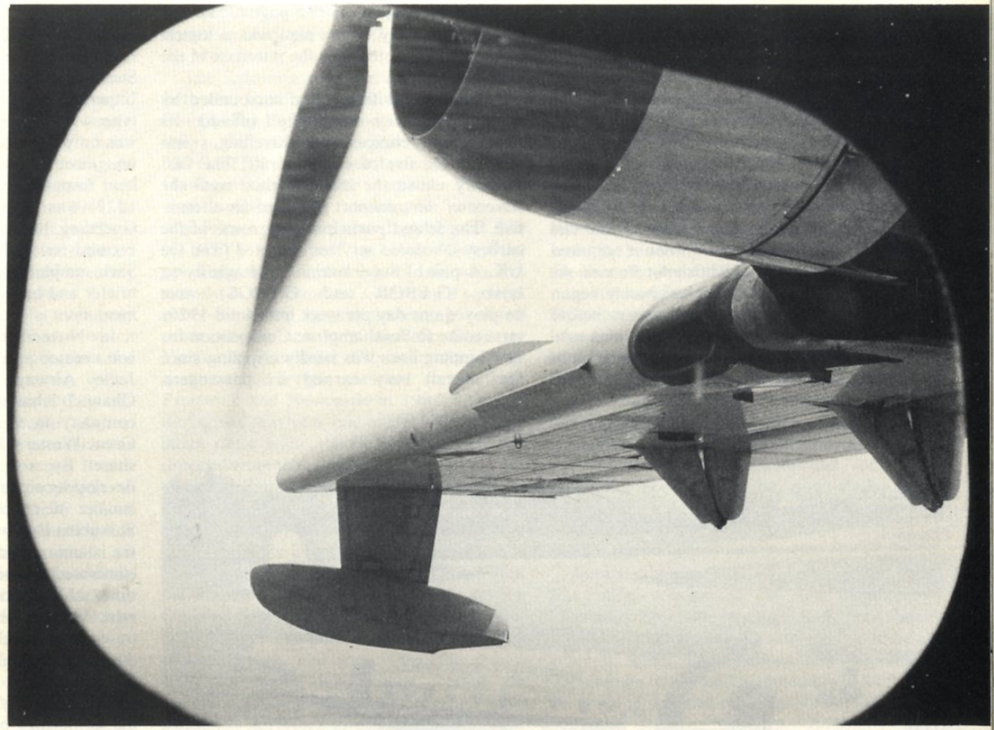
Far left, bottom: Two of the unit's Aérospatiale SA365N Dauphins at Marignane, which are used for air observation and casualty evacuation duties.

Left: Capt Bolzinger at the controls of 'Pellican 28' over south-east France.

Right: The view through one of the cabin windows of 'Pellican 28' on patrol.

Below: *Sécurité Civile* CL215 'Pellican 46' swoops low over the countryside, lining-up for a scoop at Lake Salagou and . . .

Bottom: . . . skimming across the surface of Lake Salvetat.

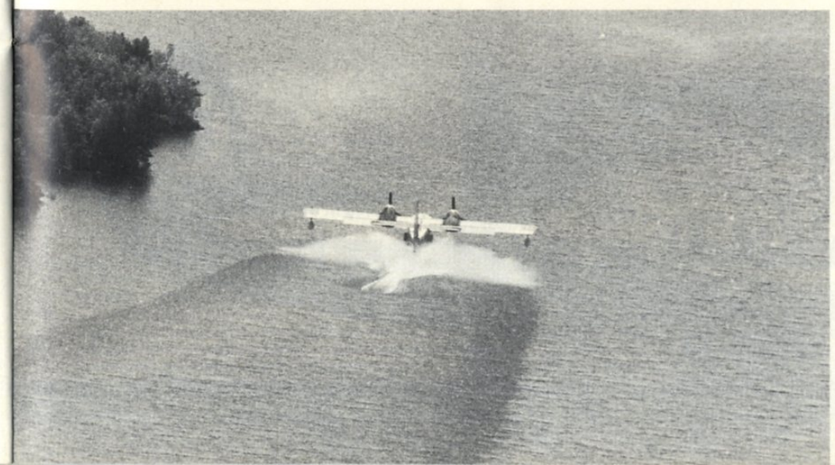


on station watching for fresh outbreaks, or if the fire is particularly extensive (some fires can be 'bombed' for two or three days before they are brought under control) they will make for the nearest convenient airfield, at a handy 200kts, to refill their tanks and return to the fire as soon as possible. A local fire-chief will often co-ordinate the ground and air fire-fighters from one of the *Sécurité Civile* helicopters, which include two Aérospatiale SA365 Dauphins and an Ecureuil recently delivered to Marignane.

To gain an insight to the very specialised and demanding type of flying carried out by the Air Group's pilots, the author was invited to join the two-man crew (pilot and mechanic) of one of the Canadair CL215s for a series of 'scoopings' and 'bombings' over the southern hills of the Massif Central. The aircraft, registered F-ZBBJ and allotted the call-sign 'Pellican 28', was captained by M. Bolzinger, a 52 year-old ex-*Aéronavale* Officer (as are all the Air Group's pilots), whose log-book entries included the Lancaster, Neptune, Crusader and Etendard, and who joined the *Sécurité Civile* in 1971. As I settled into the jump seat of 'Pellican 28', Capt Bolzinger ran up the two 2,100shp Pratt & Whitney R-2800s, fitted with automatic feathering, and lined-up alongside 'Pellican 46' our partner for the flight. The Canadiar climbed out to 4,000ft in hot and hazy conditions at a steady 140kts heading west for Lake Salagou some 100 miles from Marseilles. Although it was hot and noisy in the cockpit the visibility was excellent through the deep side windows and after 30min flying the lake, which was surrounded by hills, slid into view. Capt Bolzinger followed '46' down in a steep diving turn to 200ft to line up for the run across the water. The two CL215s were in radio contact with the local fire brigade on the ground which had cleared the lake of swimmers, yachtsmen and hopefully any debris floating in the CL215's path. Capt Bolzinger lowered the Canadair down towards the calm water and touched down at a speed of 80kts with '46' likewise alongside. The mechanic lowered the two scoops situated in the hull near the step, which acted like brakes while the pilot increased the power to maintain a speed of precisely 70kts through the water for the 10sec it took to fill the twin tanks fitted inside the aircraft amidships. With the raising of the scoops and the revs, the CL215 climbed smartly to 100ft where the mechanic opened the two 'bomb' doors and dumped the 5,500 litre load in less than 1 sec. The operation was repeated three times before Capt Bolzinger thanked the ground units for their assistance and headed west, en route for the next rendezvous at Lake Salvetat.

This picturesque lake was situated high in the hills with lush green grass and log cabins on its banks which resembled Switzerland more than the South of France. It was also completely surrounded by steep wooded hills and from the air it looked hardly big enough for the Canadairs to get down to the surface, scoop up 5,500 litre of water and climb out again, all of which requires nearly 4,000ft. Nevertheless, 'Pellican 28' followed '46' down in line astern and with the benefit of some very steep turns on both the approach and climb out completed another three scoops and releases without drama, much to the interest of the holidaymakers gathered around the shores of the lake. Capt Bolzinger rocked the CL215's wings in thanks to the firemen below and set a south-westerly course. This time he flew between the hills, just a few feet above the tree tops which in the clear weather was an exhilarating experience; but it was easy to imagine the potential dangers of having to fly this way for real when the area may be covered in smoke and the 'Mistral' is fanning the flames at anything up to 60mph. The Air Group has lost three Canadairs and their crews during the past 13 years and it is surprising that there have not been more accidents during the thousands of drops that have been made during that time.

The last lake visited was L'Estrade which lay in a wide flat plain beyond the hills near Carcassone. After another trio of scoops and drops, watched by a curious *Armée de Terre* (ALAT) Puma which hovered by the side of the lake, Capt Bolzinger brought 'Pellican 28' down for a full water landing. Despite the surface being mirror calm, which makes height difficult to judge, the big Canadair touched down at 75kts with hardly a ripple and drifted to a full stop in a very short stretch of water. When full power was applied Capt Bolzinger had to use plenty of muscle to hold the wheel fully turned to the right stop in order to get the left float out of the water, but having achieved this the amphibian was soon up on its step and climbing away with plenty of lake to spare. It was then a short hop to the historic walled town of Carcasonne where the undercarriage was lowered and 'Pellican 28' landed at the local airport just 2½ hours after leaving Marignane. After a brief stop during which some equipment was unloaded for the local fire-brigade the CL215 took-off again heading east. The coast was crossed just south of Béziers and we descended to a height 300ft over the sea which gave a superb view of the beaches and towns, including Sète and the Sea of Vaccares in the Camargue, before joining the circuit at Marignane for a landing on runway 14.



It had been a unique experience for the author but hard work for the crew who had been on duty since 08.00hrs and flown more than three hours of concentrated flying. After supervising the refuelling of 'Pellican 28' they remained on standby until dusk.

The crews are unanimous in their praise for the Canadair, their only criticism is that without an autopilot it is a heavy aircraft to fly for long periods. The Air Group would very much like to replace the DC-6 with additional CL215s, but the present state of France's depressed economy makes this unlikely.

However, it is reassuring to learn that the Canadian Government has recently given Canadair the go-ahead to lay down another batch of CL215s which will bring production of the amphibian to over the 100 mark. Most of the new production is earmarked for Provincial Canadian governments but the Company is negotiating with a number of foreign customers, including Australia and Portugal, and are hopeful of selling another 20 aircraft during the next five years.

With or without the extra Canadairs, the *Sécurité Civile* Air Group's Commandant Lohro and his 46 pilots will continue with efficiency and dedication the relentless battle against the potentially disastrous forest fires that break out in their region year in and year out.

Guernsey's own Airline

Alan J. Wright *reports from the Channel Islands on the relaunch of Guernsey Airlines*

A SHORT time before the East Midlands-based Alidair ceased operations in early August, its subsidiary, Guernsey Airlines, was purchased by Jadepoint. This company had only become involved with commercial aviation earlier in the year when it acquired the operational side of British Air Ferries. As BAF Air Tours the airline had barely begun to settle down with the new owners before Jadepoint set up Jersey Air Ferries as a subsidiary in order to further increase its connection with the Channel Islands (*Aircraft Illustrated*, August 1983, page 354). To include Guernsey in the plan was a logical extension completed with the purchase of the Island's airline.

In common with all land surrounded by water, Guernsey originally offered its residents two choices when travelling, swimming or the use of surface craft. The vast majority chose the latter method until the advent of air transport provided an alternative. The Island participated in some of the earliest scheduled services operated from the UK. A pair of Supermarine Sea Eagle flying boats (G-EBGR and G-EBGS) were employed one day per week in the mid-1920s on a route to Southampton. Competition for the shipping lines was hardly crippling since the aircraft only carried six passengers. Nevertheless the fleet was conveniently reduced by half when a ship inadvertently rammed and sunk the diminutive 'Gulf Sierra' in the harbour at St Peter Port. Imperial Airways subsequently replaced the type with the larger Short Calcutta, but it was only for a brief time since the company was more interested in developing its long haul routes. The cessation of this service in 1929 was a loss to both Jersey and Guernsey, but a new company took over the vacated route, this time using a Saro Cutty Sark amphibian. Its activities were even briefer and by the following year were just a memory.

In November 1934 Guernsey Airways was created as a wholly owned subsidiary of Jersey Airways. Both of these airlines had Channel Islands Airways as their holding company in which the UK Southern and Great Western Railway had a considerable share. By now Jersey was beginning to develop its air services more quickly than its smaller neighbour. Initially the beach at St Aubins Bay was used, but in March 1937 the island opened its airport which thereafter eliminated the need to consult both tide and time tables prior to flying. Guernsey was reluctant to establish such a facility, so its air transport still relied on such amphibians as the three-engined Saro Windhover G-ABJP for inter-island links and mainland connections. Finally after considerable debate, the authorities bowed to the inevitable and authorised the construction of an airport which was opened in 1939 just in time for WW2.

After the occupation, during which time there were of course no air services, for a short period Channel Islands Airways provided the links using Rapides until the take-over by British European Airways in 1947. The new operator continued to employ the same aircraft for a time, gradually replacing them on the UK services with DC-3s. The airports on both Jersey and Guernsey were badly affected by waterlogging from time to time since neither possessed a hard runway until late 1951, when a 1,400yd tarmac strip was laid at Jersey. It enabled the larger types such as the Viking and Ambassador to be introduced, followed by the Viscount in 1956. By this time the airport had been extended to cope with the considerable increase in traffic, but over at Guernsey progess had been very limited. The runways were still grass which meant that Viscounts were not seen at the airport. BEA therefore had to retain a few DC-3s at its Jersey base in order to maintain the Guernsey services. There was a limit to the time the airline could be expected to carry on, so once again Guernsey was forced to make the choice between improving the airport or losing its main routes entirely. Common sense prevailed with the decision taken in 1961 to provide the necessary hard runway. Once this was completed BEA introduced Viscounts to the Island, later supplementing them with the occasional Vanguard.

During this period BEA lost its monopoly on the Channel Islands routes, which became the bread and butter operations for many small ambitious carriers, often employing the same Rapides and DC-3s discarded earlier by the national airline. Gradually through the years its presence was reduced until in 1979, its successor, British Airways, announced it was proposing to relinquish the licences held for 26 routes. Many of these involved the Channel Islands particularly Guernsey, which would no longer be served by the airline. Immediately applications were filed with the CAA by interested independents, one of which was Guernsey Airlines.

This small carrier had been formed in April 1977 by Alidair in order to provide charter and in due course scheduled services. It naturally applied for the vacant routes serving Guernsey from Southampton, Gatwick, Heathrow and Manchester. At the time Viscount 735 G-BFYZ comprised the fleet, this being leased from the parent company. It was intended that at least two of the surplus BA Viscount 800s would be acquired following successful applications in order to maintain the new schedules. Unfortunately the Manchester-Guernsey route was the company's only reward which was alone insufficient to justify increasing the number of aircraft flown. In the meantime the carrier's Viscount had been severely bent at Kirkwall in late October 1979, necessitating a replacement again on lease from Alidair. The newcomer was G-BDRC, a series 724 which had served with Trans Canada for its first nine years before moving to the French operator Air Inter to spend the next 11 years of its life. After Alidair acquired it, the aircraft was operated on lease by both Intra Airways and Dan-Air before finally entering service with Guernsey Airlines in 1980, in readiness for the Manchester schedule.

The following year the airline took over both the Cambridge and Staverton routes from Jersey European and Dan-Air respectively, for which purpose the Shorts 330 G-BITX was leased from Alidair. However this machine and the Viscount were subsequently employed on the schedules as loads dictated. A second 330 (G-BITV) employed by Inter City, the operating title adopted by Alidair, was frequently to be found on Guernsey's services either replacing or supplementing one or other of the carrier's aircraft. Similarly Viscounts from Inter City were frequently used on the longer seasonal routes from Prestwick and Newcastle in 1981, although during the next year one of the 330s flew the latter route while the Scottish airport was dropped from the network.

The airline achieved a notable success in September 1982 when it was awarded the Guernsey-Gatwick route by the CAA at the expense of Air UK. The latter had won the licence when it was given up by BA in 1980, but attracted a fair amount of criticism for the shabby condition of its Heralds. The change from the pressurised airliner to the smaller Shorts 330 met with little public resistance when the service started on 1 April 1983. Most passengers were pleasantly surprised at the amount of room available, while the flights frequently took on the atmosphere of a social outing. Air UK appealed in vain, the pressurised, over-the-weather comparison remaining a major feature in the case. The carrier was however, at a disadvantage. The islanders actually wanted their own airline and now at last they had it operating on one of the main life lines to London. This they intended to keep.

When Jadepoint took over Guernsey Airlines a few months later, the sale included the 330 but not the Viscount previously on strength. The oil charter contracts with Shell in Scotland were also transferred to the new owner which found it necessary to acquire the two Viscount 700s used on the work. The change brought the Channel Islands carrier the benefit of support from British Air Ferries. In fact almost immediately the Herald G-ASVO was given Guernsey Airlines titles and pressed into service when necessary, particularly on the weekend London sectors. This was a temporary expedient prior to taking delivery of a second 330. In addition Viscount 806 G-AOYI was transferred to the company and formally named *Island of Guernsey* on 18 August. The aircraft also carried the legend British Caledonian Commuter Colleague forward of the rear passenger door. This arrangement had been made a day or two earlier and will provide improved facilities for passengers interlining through Gatwick. It will also assist in the setting up of new routes which is the ultimate aim of the new management.

In retaining its identity instead of becoming Guernsey Air Ferries or the like, the airline intends to strengthen its presence on the Island. Conscious of its responsibilities to the local community, it proposes to operate the schedules at fare levels set as low as economically possible. Furthermore a guarantee was given that no increase would be made for 12 months. This augers well for the Guernsey population who now have an airline with a promising future serving their Island without the infuriating word 'Jersey' to be seen!

Another development involving Guernsey was also announced at the relaunch ceremony. This was the award to BAF of the mail and newspaper contract held for some years by British Island and latterly Air UK. The change over was scheduled for October. To assist in this and other cargo work, BAF acquired the ex-Southern International freighter Viscount G-BBDK which has been a familiar landmark at Stansted for a couple of years or so.

Finally it is worth recording that the confusion surrounding the airline names at Southend has been eased with the purchase by Jadepoint of the name British Air Ferries. It is now the title used by the company and replaces the BAF Air Tours identity used for a relatively short time. BAF Engineering has also been taken over and renamed Jadepoint Aircraft Engineering, a move that not only secures the maintenance future for the airlines, but also enables a modernisation programme to be introduced in line with BAF's own plans for new aircraft in due course. All that is left of the original organisation is BAF Leasing which still has Viscounts and Heralds available but remains a part of the Keegan Group. All in all 1983 has been an eventful year for Jersey, Guernsey and British Air Ferries.

Above left: Viscount 806, G-AOYI, freshly painted in the titles of Guernsey Airlines and seen at Le Touquet airport, France. The aircraft was transferred to the company and formally named *Island of Guernsey* on 18 August. *Photo: Allan Burney*

Left: Not included in the sale of Guernsey Airlines to Jadepoint was Viscount 724, G-BDRC. *Photo: Alan Wright*

Right: Used on both the Guernsey-Gatwick schedules and weekend trips to Cambridge and Staverton, the Shorts 330 G-BITX remains in Guernsey Airlines' service. *Photo: Alan Wright*

'MALLET BLOW'

an exercise in offence and defence

Robin Sinton *reports from the Otterburn Ranges on the 'Mallet Blow' series of exercises*

THE high moors on the England/Scotland border are not dissimilar to the landscape of the Falkland Islands. Bleak rolling hills stretch almost as far as the eye can see. Sparse stunted trees cling to the hillsides seeking shelter from the almost continuous wind. Few animals can be seen, only the hardy Cheviot sheep graze among the heather.

This tranquil scene is suddenly transformed to the present day as two RAF Buccaneers swoop low over the countryside, neatly plant their bombs on a line of vehicles simulating an enemy convoy and smoke away behind the neighbouring hills. This then is Otterburn, the largest overland range in the British Isles. It comprises several thousand acres of MoD-controlled land used by all three services for training purposes, following a precedent set over two thousand years ago by the Roman Army which established the most northerly major camp in the area.

On four occasions this year, strike aircraft of the RAF, USAF and many European air forces converged on this range to take part in 'Mallet Blow', an exercise designed to improve ability and techniques in both offensive and defensive support operations.

Exercises are a way of life in modern air forces. They vary from comparatively simple paper exercises involving administrative, engineering, and supply wings to full blown NATO manoeuvres involving the land, sea, and air forces of many nations. 'Crusader 80' fell into this last category, all NATO forces plus reinforcements from the US, and the Territorial Army were involved.

The 'Mallet Blow' series has been running since 1978 and was designed to fill a gap in the training facilities available to strike aircraft in the UK and Germany. Because of the small, densely populated size of the British Isles, live firing ranges tend to be limited in both numbers and size, and furthermore are nearly all located along the coasts or offshore. These ranges are adequate for routine training but it is very difficult to achieve a co-ordinated sense of realism under these circumstances. The range areas are distinctive and being set near the coast have approaches that are both well known and are untypical of routes that may have to be followed if strike forces were ever called upon to act in anger.

'Mallet Blow' is planned and controlled at RAF Strike Command Headquarters, High Wycombe and the first problem that is encountered is that range time at Otterburn is at a premium. The RAF has to share the range with many other users and as only five weeks in a year can be allotted, the time has to be booked two years in advance. The exercise planners aim to provide a variety of targets in different locations for the incoming aircraft to attack. These are chosen to give individual squadrons a wide choice of attack profiles over the period of the exercise. In addition several approach routes are designated both to minimise noise and to allow interceptions by 'defending' forces both before and after the attacking aircraft have been through the range.

RAF squadrons are not specifically ordered to take part in 'Mallet Blow'. It is up to the planners to make the format of the exercise attractive enough to make individual units want to include it in their training programme. As well as UK based squadrons and OCUs, elements from RAF Germany always take part, and invitations are also extended to air defence squadrons to provide the defensive forces. Other NATO air forces were quick to see the value of 'Mallet Blow' and are invited to take part. The largest of these is USAFE which usually provides F-111 aircraft from both Upper Heyford and Lakenheath and A-10A Thunderbolt IIs from Bentwaters. Recently other types have been seen in the exercise. F-15 Eagles from Soesterburg AB have taken part as interceptors over the North Sea, Air National Guard A-7D Corsair IIs from Pittsburgh visited in April and for the first time a Boeing E-3A Sentry AEW aircraft was used orbiting over the North Sea to give early warning of low flying incoming raids to the Combat Air Patrols (CAP) operating along the approach routes. Other regular users of 'Mallet Blow' are the RNethAF with F-104 and F-16 aircraft and the RDAF with its distinctively shaped Drakens.

Above: A Rapier surface-to-air missile unit in operation at Otterburn. The operator, using an optical tracking system can remotely control the fire unit, seen here in the background.

Left: A display of aggressive flying as this F-111 pulls hard after attacking an 'enemy' convoy.
All photos by the author

As previously stated, individual units are deliberately given a large amount of freedom in how they plan and execute their missions. They are expected to fly a four ship formation twice a day, but it is left up to squadron commanders to decide whether the actual attack is in four, pairs or singles.

In order to look at the planning and operation of 'Mallet Blow', the author first visited RAF Boulmer, 25 miles away from the range on the Northumberland coast. Boulmer is one of a chain of radars on the east coast which not only watches for intrusions into UK airspace but acts as a joint facility with the National Air Traffic Control system to provide radar facilities to civil air traffic. A separate unit at Boulmer handles fighter control operations and it is here that incoming 'raids' are tracked. In order to escape detection from ground based radars all military aircraft are forced to fly at very low levels and consequently the time to vector the CAP to meet them is limited. This deficiency is now being met by the use of early warning airborne radars in aircraft such as the Boeing E-3A Sentry and, from next year, the AEW variant of the Nimrod. Modern computer processed radar displays can give a tremendous amount of extra information on the screen, but it was still surprising to see raid details appearing without an accompanying 'blip'. This was information on low flying aircraft below the radar horizon which had been detected by the Sentry and the details passed by a secure data link to Boulmer. Here it was evaluated as a threat and put on to the fighter controllers' screens. The aircraft, Jaguars and F-111s were flying at heights of 250-300ft above the sea and at 80 miles range would be invisible without the aid of AEW.

The sky at that time over the North Sea was quite busy. On the edge of the display was the racetrack pattern being flown by the Sentry, and a similar pattern about 60 miles away showed the orbiting Victor tanker which was providing support for the CAP Phantoms from Leuchars and Wattisham. Two No 43 Squadron aircraft were returning to base while a further pair from Wattisham were taking up position after a high-level transit to conserve fuel. As missions coming up to the range were identified, the fighter controllers would send one Phantom to investigate, holding the other in the event of another raid developing. As a measure of the realism set up in the exercise, all the attacking aircraft are fully responsible for their own defence and have to contend with radar and radio jamming. Several 'kills' were called over the radio but even then some incoming aircraft were able to sneak through the CAP and still at low-level go overland to set themselves up for the run in to the range.

The scene now changes to a windswept observation point 1,100ft above sea level at Otterburn. There are two operational areas and at this position we can see the sets of targets which are in use. A group of white minibuses are grouped on a hillside to simulate a 'soft skinned' enemy convoy while armour was provided in the form of several old tank hulks. For close air support and

Left: An RAF Jaguar pulls-up after attacking the runway target at Otterburn. His practice bomb has fallen slightly off target at the left. Two Andover hulks can be seen lined-up at the end of the simulated runway.

Below left: Blowpipe, a man portable surface-to-air guided missile is one of the new 'threats' introduced into the 'Mallet Blow' series of exercises.

Right: An Army Forward Air Controller working with an A-10 Thunderbolt II. The FAC will give tactical instructions to the aircraft to provide close air support.

pinpoint attacks, a small bridge over a gully was to prove a very hard target to hit. I was surprised by the use of white vehicles as in a real situation all vehicles would be camouflaged, but was told that peacetime safety requirements demanded more visibility against the background of the hills.

The other operational area, to be used the following day has a completely different set of targets. A surface to air missile site, complete with dummy launcher and missiles, another convoy, and the largest target on the range, a 6,000ft long runway, constructed by ploughing the edges and centreline and marking the area with white paint. To complete the picture there were scrapped Wessex helicopters and Andover aircraft dispersed as at a real airfield.

Having previously declared their intended targets and times the fast jets on interdiction missions are allocated a 'slot' on the raid plan and will run in to range on one of several set headings. These are one of the few tactical limitations in the exercise and are for range safety purposes. The attack headings are achieved by flying to an 'initial' point which is a conspicuous point on the ground such as the corner of a wood or a prominent hill and setting the final heading and speed at this point. The incoming aircraft listen out on the Range Safety Officer's radio frequency. The Range Safety Officer is responsible for the overall safety on the range especially when live firing or weapon release is taking place. He is usually a forward air controller and as well as being able to clear the aircraft for live firing and give permission for re-attacks within the slot time, he will actively control aircraft like the A-10 as a close support aircraft. The ground operation also provides laser target marking (LTM) in which portable laser units which emit coded pulses of laser light are used to illuminate the targets. Equipment in the aircraft will then receive this light and lock on to it to give range and bearing information to the on-board weapons computer. The purpose of this type of equipment is to try to achieve the best possible accuracy on one pass attacks.

In keeping with the aims of realism and to apply lessons learnt in the South Atlantic, Army Air Defence units and the RAF Regiment Rapier units regularly deploy to Otterburn. The attacking pilots are aware that

they are being opposed by Rapier and Blowpipe surface to air missiles. As well as these threats, a mobile threat simulator from the nearby electronic warfare range at Spadeadam is located in such a position as to activate the warning systems in the aircraft during the run in by simulating other SAM launches.

The scoring of the attacks is based upon the accuracy of bomb dropping and until recently was done entirely by triangulation from two positions using theodolites. However the improved accuracy with modern weapons systems, especially that in the Tornado has resulted in new methods being devised, including the use of video cameras.

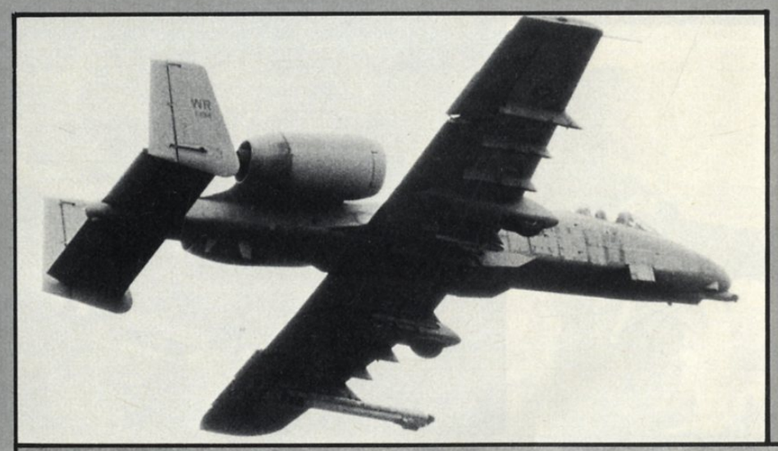
It is RAF practice to detail young pilots from the OCUs or TWU at Brawdy to observe and score on these exercises. A student from the Harrier OCU at Wittering commented, 'It's nice to know what you are up against', after seeing video evidence of a Rapier kill. The Rapiers at Otterburn were using optical tracking and even though the exercise rules state that a target has to be tracked for a continuous seven second period this would have still resulted in a high percentage of casualties on many of the incoming attacks. The results from the attacks and the SAM sites are fed back daily to the squadrons involved in the exercise in order that they can learn from the previous day's raids and possibly adapt their tactics for following missions. The overall results are highly classified as this is obviously exactly the type of information that a potential enemy would like to know.

The author observed a number of attacks over a period of several days and saw the wide variety of attack profiles and the varying degrees of success by over 60 aircraft from many different units. It is very difficult to draw direct comparisons because the different safety restrictions imposed by some countries mean that their training cannot result in the same proficiency when tested during an exercise such as 'Mallet Blow'. The overall standards of all the RAF aircraft were very high with good accuracy in weapon placement, however, with 2,000ft hills around the range there were noticeable differences in technique in leaving the range. Some aircraft smoked away below the skyline down valleys, but others pulled up earlier, leaving themselves very vulnerable to SAM attack. The USAFE seemed generally to find navigation in the English 'murk' more difficult and although the F-111s made some very impressive attacks in marginal weather there were several instances when the range safety officer had to stop the run in as the aircraft were outside their safety limits. This apparently is accepted as a problem by USAFE as many of the crews take some time on posting to the UK to get used to European conditions. Very strict USAFE safety rules regarding minimum visibility and height also tend to limit approaches in marginal conditions.

The unique role of the A-10 was demonstrated at Otterburn with the phenomenal accuracy and power of the GAU/8 30mm cannon. Soft skinned targets such as minibuses were literally torn apart and the manoeuvrability of the aircraft meant that two or more targets could be attacked on one pass. The A-10s operating as close support were usually under the control of a forward air controller but even then their tactics at times seemed more appropriate to an air display than simulated combat conditions. Their approach to the targets tended to be very high and in some cases a diving guns attack meant that this large, slow aircraft was exposed for a long period of time to the waiting Rapiers and Blowpipes. Whether of course the same tactics would be employed in a real combat situation it is difficult to tell. Other NATO aircraft from Germany, Denmark and Holland give consistently good results, Dutch F-104s showing in many cases remarkable accuracy for an aircraft that was never intended for the ground attack role. Sadly, the fact that these exercises are not just a game was brought home when an RNethAF F-104 impacted on the hills behind the target area after carrying out an attack, killing the pilot. This was the first casualty experienced since the 'Mallet Blow' exercises started in 1978.

This then is 'Mallet Blow', a continuing series of exercises to develop and test the latest ideas in offensive and defensive support. The exercises do not seek to compete with or emulate 'Red Flag'. The circumstances are completely different; 'Red Flag' has much more room, so that aircraft can fly lower, and faster, while 'Mallet Blow' provides a realistic exercise to train pilots in support operations and also allows the testing and development of new techniques and equipment. Recent new developments include toss bombing by Tornado aircraft. This enables the attacking aircraft to release the bomb several kilometres away from the target and makes the job of the defender that much more difficult. The results showed the need for the more accurate methods of scoring talked about earlier as the American jest about 'putting a bomb in a pickle barrel' sums up the demonstrated accuracy of the Tornado weapons delivery system.

More and more units are asking to participate in 'Mallet Blow' which means, so the planning staff say, 'we must be getting it right' and the exercises will continue at approximately 3-4 month intervals. Support operations are always going to be needed and some measure of the success in the South Atlantic can be put down to the value of the bleak Otterburn range and exercise 'Mallet Blow'.



Above right: ECM is of major importance on modern strike aircraft. To give some protection against 'enemy' radars, this A-10 is carrying an ECM pod on the outer port hardpoint.

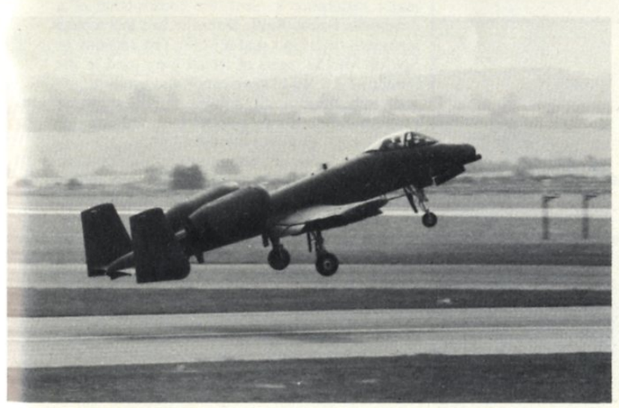
Right: New shapes in the sky. As the RAF Tornado strength builds up, more and more of the type are seen taking part in 'Mallet Blow'. In the background can be seen the trucks forming the simulated dispersed convoy target.

airregister

Compiled by **A. J. Wright**

THE MUCH heralded airship revival seems to have arrived with no fewer than five such devices receiving registrations this month. It would appear that in some cases the sale of the exhibits at Southend has been an advantage, allowing some of the aircraft an opportunity to fly again. Following the Sea Fury registered earlier, come the Sea Hawk and Meteor 7. It is a pity that some of the others could not have looked forward to similar treatment instead of being destined to continue as dust traps.

Registration	*Type*	*C/n*	*Owner or operator*
G-AAVJ	DH60M Moth	157	R. I. & J. O. Souch (N573N)
G-BKRA	AT-6G Harvard	—	T. S. Warren (MM53664)
G-BKTJ	Cessna 404	0236	Donington Aviation Ltd (LN-VIN/SE-GYL/N88721)
G-BKTV	Cessna F152	1450	The London Flight Centre Ltd
G-BKTZ	Slingsby T-67M	2004	Slingsby Aviation Ltd (G-SFTV)
G-BKUC	CAARP CAP-10B	200	D. M. Britton
G-BKUU	Thunder Ax7-77 balloon	522	Thunder Balloons Ltd
G-BKUW	BAe 125 srs 800	258003	British Aerospace PLC Aircraft Group
G-BKUX	Beech C90 King Air	LJ-1073	Marchwield Aviation Ltd
G-BKVG	Scheibe SF25E Super Falke	4362	Westland Flying Club Ltd
G-BKVH	Cessna 404	0056	East Midlands Aviation Ltd (G-WTVA/N5438G)
G-BKVJ	Colt 21A balloon	518	Colt Balloons Ltd
G-BKVK	Auster AOP9	AUS/10/2	J. Powell & ptnrs (WZ662)
G-BKVM	PA-18 Super Cub 150	18-849	N. D. Meredith-Hardy (PH-KAZ/R-214/51-15684)
G-BKVN	PA-23 Aztec 250F	8054005	V. G. Instruments Ltd (N9659A)
G-BKVO	Pietenpol Aircamper	47-10799	M. J. Honeychurch
G-BKVP	Pitts S-1D	002	P. J. Legg
G-BKVS	Bensen B8M	VS-01	V. Scott
G-BKVU	BAe Jetstream 31 02	615	McAlpine Aviation Ltd
G-BKVY	Airtour 31 balloon	AH-001	Airtour Balloon Company Ltd
G-BKVZ	Boeing 767-204	22981	Britannia Airways Ltd
G-BKWD	Taylor JT-2 Titch	2	E. Shouler
G-BKWG	PZL-104 Wilga	17820687	Anglo Polish Sailplanes Ltd
G-BKWH	Cessna F172P	2196	W. H. & J. Rogers Group Ltd
G-BKWI	Pitts S-2A	2268	G. C. Masterson (N5303H)
G-BKWK	Short SD3-60	SH3621	Short Bros Ltd
G-BKWL	Short SD3-60	SH3622	Short Bros Ltd
G-BKWM	Short SD3-60	SH3623	Short Bros Ltd
G-BKWN	Short SD3-60	SH3624	Short Bros Ltd
G-BKWR	Cameron V-65 balloon	970	April & Gilbert Games Photographers
G-BKXB	Steen Skybolt	64-10722	P. W. Scott
G-CYMA	GA-7 Cougar	0083	Cyma Petroleum Ltd (G-BKOM/N794GA)
G-FLIC	Cessna FA152	0374	Birmingham Aviation Ltd (G-BILV)
G-JETH	Hawker Sea Hawk FGA6	—	Brencham Ltd (XE489)
G-JETM	Gloster Meteor T7	—	Brencham Ltd (VZ638)
G-KATS	PA-28 Cherokee 140	7325022	J. R. Burgess (G-BIRC/ OY-BGE)
G-KISS	Rand KR-2	129-10899	A. C. Waller
G-LEAN	Cessna FR182	0018	Velcourt (East) Ltd & Maidenhill Holdings Ltd (G-BGAP)
G-OIAS	PA-31 Chieftain 350	7405442	Inkerman Air Services Ltd (OY-CBF/D-IGSA/N54322)
G-OMJH	Hughes 369E	0009E	M. J. Hughes
G-PLUM	Bell 206L LongRanger	45058	PLM Helicopters Ltd (LN-OQK)
G-PUME	AS332L Super Puma	2091	Management Aviation Ltd
G-PUMG	AS332L Super Puma	2095	Management Aviation Ltd
G-PUMH	AS332L Super Puma	2101	Management Aviation Ltd
G-SKSB	Airship Industries SKS-500 Airship	1214/04	Airship Industries (UK) Ltd
G-SKSC	Airship Industries SKS-600 Airship	1215/01	Airship Industries (UK) Ltd
G-SKSD	Airship Industries SKS-600 Airship	1215/02	Airship Industries (UK) Ltd
G-SKSE	Airship Industries SKS-600 Airship	1215/03	Airship Industries (UK) Ltd
G-SKSF	Airship Industries SKS-600 Airship	1215/04	Airship Industries (UK) Ltd
G-SOFA	Cameron N-65 balloon	968	Northern Upholstery Ltd
G-STEW	PA-28-181 Archer II	8090008	Stu Davidson & Son Plant Hire Ltd (OY-BRU)



'WARTHOGS' at Kemble

Aldon P. Ferguson *provides an update to his feature on RAF Kemble that appeared in last month's issue*

IN late 1982, it was announced that RAF Kemble and 5 MU were both to be closed as an economy measure. The excellent facilities, quiet air space and civilian workforce were all to be given up and the 'Red Arrows' were to be transferred to a newly combined CFS at RAF Scampton. At the same time, and quite fortuitously, USAFE was seeking a depot for maintenance facility for its A-10 aircraft of the 81st Tactical Fighter Wing (TFW) at Bentwaters and a memorandum of understanding was signed by both parties which catered for the A-10 work to be carried out by RAF Kemble on behalf of USAFE. It was also decided to retain a small RAF task at Kemble, consisting of storage and modification work on RN Sea Devon, Sea Heron and Jetstream aircraft. The first A-10 Thunderbolt IIs arrived in late March 1983, and Kemble assumed its new role as a joint RAF/USAFE Maintenance Unit on 1 April 1983. USAFE established the Airforce Logistics Command, Support Centre Europe (AFLC/SCE) to task, advise and monitor the Kemble operation and to provide an interface with USAF logistics agencies. The A-10 work developed rapidly and by August some 45 aircraft had passed through the modification and corrosion control programmes. In addition, new tasks were introduced which included the respraying of OV-10 Bronco aircraft and F-4 Phantoms.

The RAF's oldest MU is therefore to stay in operation and Kemble will remain an RAF station within RAF Support Command, albeit an unconventional one, with an RAF Commanding Officer.

Above left: An A-10 Thunderbolt II of the 81st TFW undergoing anti-corrosion work at RAF Kemble in August.

Left: An overhauled A-10 Thunderbolt II takes-off from RAF Kemble on a test flight.

Left: Impressive line-up at St Mawgan on 10 August for the huge International Air Day. *Photo: Peter R. March*

airview

Peter R. March

Abingdon debuts

Above: The first public appearance of an RAF TriStar (ZD948) was at RAF Abingdon for the Battle of Britain display on 10 September. *Photo: Peter R. March*

Below: VC10 K2, ZA140, shows its centreline drogue during a flypast at RAF Abingdon. The code 'A' and No 101 Squadron colours on the fin should be noted. *Photo: Andrew March*

Bottom: Making an appearance at RAF Abingdon was new BAe125 CC3, ZD620, of No 32 Squadron. *Photo: Peter R. March*

Airshow 83

The last half of August and into September sees the conclusion of the big service events in the UK with open days at a number of RAF stations, the Navy Days at Portsmouth and Plymouth and the Battle of Britain displays at the now familiar quartet of mainland airfields and the Channel Islands. Following the successful Open Day at St Mawgan on 10 August, which was attended by nearly 40,000 people, it was the turn of RAF Valley to hold its event three days later. Being the only air show held in North Wales this year and in ideal weather conditions, it was not surprising that it too was well supported by the public. An extensive static display of some 38 aircraft included good representation from the USAF, German, Danish and Belgian air forces. The Germans were also surprise participants in the 30 item flying programme with a formation of four Alphajets. Two aircraft which were once very much part of the Valley scene, the Gnat and Hunter, made welcome re-appearances in the shape of civilian owned G-GNAT and G-HUNT. Other popular items included the Battle of Britain Memorial Flight, the Vintage Pair and of course the 'Red Arrows'.

The weather was not so kind for the first two of this year's Battle of Britain At Home Days on Saturday 10 September, at St Athan and Abingdon. These two bases together provide the majority of the RAF's overhaul and support facilities for its operational aircraft. St Athan has responsibility for the Buccaneer, Lightning, Phantom, Harrier and Tornado, while Abingdon deals with the Jaguar, Hawk and Hunter in particular. The South Wales station is now one of the RAF's largest bases in terms of personnel, with No 4 School of Technical Training being another important resident. It has a natural advantage in terms of the annual At Home event by having so many aircraft to draw upon for its static aircraft park, not least the Historic Aircraft Collection.

There were no newcomers amongst the historic aircraft this year, although several of the exhibits had received attention since 1982. The record breaking Hunter F3 WB188 was looking immaculate once again and the 1956 Suez markings on Canberra B2 WD935 are now complete. The trio of Percival aircraft (Proctor III Z7197, Provost T1 WV499 and Jet Provost T1 XD674) were displayed together to mark Percival's 50th anniversary this year. In the hangar display the Fiesler Storch 475081/VP546 was seen to have progressed considerably since last year, with reassembly almost complete and the airframe awaiting recovering. Work has now begun on the next major restoration project, the construction of a composite Fairey Battle from the two incomplete airframes of L5343 and P1283. The remains of Spitfire Mk732, parts of which were used in the rebuild of AB910 following its Swiss accident, are not to be kept at St Athan. A notice on the fuselage stated that the aircraft was to be donated to the Dutch Air Force museum.

Among the more modern aircraft in the static display were Tornado GR1 ZA450, just out of the maintenance unit where it had been prepared for delivery to No 15 Squadron at RAF Laarbruch. Tornados going to Germany have the laser rangefinder fitted below the nose and carry bilingual external lettering. Victor K2 XL192 appeared in the new hemp colour scheme contrasting with the RAE's brightly painted Comet XV814 with its 'raspberry ripple' colours. The only overseas representation in the ground display came from the USAF with Bronco 68-03801 and the RNethAF with F16-A Fighting Falcon J-240.

The latter air arm also took part in the flying programme with another F-16A, J-251, and the familiar but no less impressive F-27 Troopship display using aircraft C-7. The flying opened with a British Airways Concorde en-route to New York making a low pass and also included the RAF's new BAe146 ZD696 and VC10 K2 ZA140 now sporting No 101 Squadron markings and the large code letter 'A' on the fin. Missing from the display were the Spitfire and Hurricane, both grounded because of the strong winds and showers. Lancaster PA474 was able to make it in spite of the weather.

Abingdon's aircraft maintenance squadrons are responsible for the major servicing and modification of Jaguars, Hawks and Hunters with about two dozen aircraft being worked on at any one time. The station also houses the RAF's Repair and Salvage Squadron, the Inspectorate of Recruiting Exhibition flight, London and Oxford University Air Squadrons and No 6 Air Experience Flight. It also provides a storage facility for the VC10s purchased from British Airways for possible future conversion to tankers. Representative aircraft from most of these units appeared in the 'At Home' static display on 10 September. Unlike St Athan the aircraft overhaul facilities were open to the public and a number of Jaguars and Hawks in various stages of major servicing were on view. Other aircraft in the static line-up included a Sea Hasrrier, French AF Mirage F1 and RAE Viscount XT575. The latter aircraft with its under fuselage radars and other antennae was making its second, rare public appearance this summer, having made its flying debut at St Mawgan the previous month.

Abingdon's flying display was somewhat dampened by a number of heavy showers and combined with gusty winds prevented the Memorial Flight's Spitfire and Hurricane from getting airborne. However, there was varied representation from the present day RAF including the three new types — BAe 146, VC10 K2 and TriStar from nearby Brize Norton. The TriStar ZD948 was making the type's first public appearance, this aircraft being notable in that it retained the dark-blue painted lower fuselage from its British Airways service. A tactical demonstration involved a Lyneham Wing Hercules, No 7 Squadron Chinook and a quartet of Jaguars from 226 OCU. Many of the aircraft flying at Abingdon and St Athan also 'visited' Lyneham's Families Day en route.

The late-summer air events were not restricted exclusively to RAF shows by any means. On 13-14 August a 1930s style fly-in and garden party was held at Barton, Manchester. Excellent weather brought out nearly 150 aircraft during the two days, ranging from micro-lights to Partenavia G-WICK and including good representation of home-builts. Amongst the prize-winners was Jodel G-GOSS (which seems to win the best Jodel prize wherever it goes) and recently restored Taylorcraft/D G-AHGW. This aircraft has been painted as an Auster 1 and carries its former serial LB375. It won the prize for the best 'warbird' at the fly-in. The organisers are to be commended for efforts put in to making this such an attractive event for both the flying participants and the enthusiasts who came along.

The annual RAFA Midlands show at Coventry on 14 August was well attended, but not quite up to the record crowds of the last couple of years. The 'star' item was switched from Concorde to a 'battle' set-piece involving a hotch-potch of warbirds including the B-17, Spitfire 14, Nord 1002 and scale Fw190. Unfortunately several of the expected aircraft dropped out and the whole sequence was rather ineffective, particularly when a fault developed with the pyrotechnics. With the last minute withdrawal of much of the USAF participation the show relied heavily on RAF and civilian items. Among the latter highlights were

Above: Rare RAE Viscount, XT575, appeared in the flying display at St Mawgan on 10 August and the static park at RAF Abingdon on 10 September. *Photo: Daniel March*

Below: RNethAF F-16A, J-251, gave a superb display at St Athan Battle of Britain display on 10 September. *Photo: Peter R. March*

the Gnat G-GNAT, T-33, Stearman and Spitfire 1 AR213. As is customary at this event local airlines provide flypasts, newcomers this year being Birmingham Executive Airways with its two Jetstream 31s. The operation of RAF Phantoms from No 111 Squadron out of the airfield for the display was the first time that this fighter has been seen at Coventry.

The air show at Halfpenny Green on 21 August organised by Jock Maitland's Air Displays International was an event not to be missed especially if the Westland Lysander appeals to you. For the first, and as it turns out to be the only occasion, Doug Arnold's Lysander V9281/G-BCWL took part in the flying programme. It was flown by the CAA's Darroll Stinton, who gave it the last outing several years ago at Yeovil. Following the excellent display he departed for Blackbushe but unfortunately did not get far across the Midlands before he had engine trouble. After vain attempts to keep the motor turning he was forced to land in a field near Shipston on Stour. The field was very soft after recent ploughing and while braking to avoid a hedge looming up, the wheels dug in causing the Lysander to flip over on to its back. This destroyed the fin and rudder and appears to have caused some damage to the wing as well as bending the propellor. The aircraft was removed by Peter Arnold a few days later by road back to Blackbushe where it disappeared into the hangars for what will probably be another long stay. Also taking part in the Halfpenny Green event were Vampire T11 WZ507/G-VTII rapidly recovered from its forced landing at Hullavington on 17 July, Spitfire 14 G-FIRE, Provost WW397, Fokker S11 G-BIYU, Dakota G-APML, Argus HB751 and Gemini G-AKKB. A much happier day was had by Mr Arnold's other participant in the air show, the Mustang G-PSID.

Below: A rather sad view of Doug Arnold's Lysander V9281. The aircraft overturned during a dead-stick landing while en-route to Blackbushe from its public show debut at Halfpenny Green on 21 August. *Photo: Roger Wright*

Top: Newcomer Trago Mills SAH1 came in for a lot of attention at Cranfield.
Photo: Peter R. March

Above: Prototype RF10 motor-glider, F-WARJ, was another newcomer at Cranfield.
Photo: Andrew March

Another fly-in at the end of the month, this time in the south of England at Compton Abbas on 29 August was well supported, despite some doubtful weather at the start of the day. Star arrivals were the recently completed Replica Plans SE5A G-INNY, painted up as F5459 and Harvard G-BIWX which carries the serial FT239 (previously carried by G-AZKI before it reverted to its correct markings as FT229). Amongst the remaining 80 or so visitors were Taylor Monoplane G-BEVS, Falconar G-BDPL, Falco G-VEGL, Cubs G-BFZB, G-BGSJ and G-BILI, ranging up to Partenavia G-KWIK and Barons G-BFEE and G-BLJM.

What should have been one of the biggest fly-ins of the year, the Business and Light Aviation Show at Cranfield on 1-3 September turned out to be quite a modest event, largely because of the appalling weather which hit the second and third days. The number of trade stands and participating companies was also fewer than on previous occasions with a number of notable absentees including Eagle, Express and CSE on the major distributor side. Several new light aircraft prototypes made their first UK appearances at Cranfield. The Trago Mills SAH1 G-SAHI from Bodmin, Cornwall is a low-wing, two-seat, aerobatic trainer with an all-metal airframe. Flown for the first time by AVM Geoffrey Cairns a week earlier, the SAH1 had only 10 hours flying on the clock when it appeared at Cranfield. It undoubtedly received the greatest attention from the visitors to the show and designer Syd Holloway was kept very busy answering questions about its construction and performance.

Another newcomer was the French designed Fournier RF10 F-WARJ, the T-tailed fourth prototype. This glass-reinforced-plastic constructed motor-glider is in the same class as the German Grob and Hoffman machines. From the same Fournier background, the Slingsby T67M Firefly G-SFTZ also uses GRP for its construction, the type making its debut in the military-pilot trainer guise at Cranfield and destined after certification for delivery to Specialist Flying Training at Hamble. Other relatively new aircraft on show included the Vinten 116 autogyros G-SCAN and G-VIEW, designed by Ken Wallis and now powered by the 85hp Weslake two-cylinder engine. At the other end of the scale British Aerospace showed its 125-800 G-DCCC and a plethora of Jetstream 31s including G-JSBA, G-CONE and G-BKVU. The last of these, a 'green' aircraft flown for the first time on 26 August as G31-615, was marked as the second Jetstream for McAlpine to complete as an executive aircraft. However, after the show it returned to BAe for further test flying, with another aircraft G-BKUY destined for delivery to McAlpine on 9 September. G-CONE which was flown from East Midlands to Cranfield on 1 September after fitting out and painting by Fields, returned to Prestwick the following day and by 5 September had re-appeared as G31-42. There were also three original Jetstreams in evidence at Cranfield G-GLOS, G-AXUM and G-AWVK, the latter in the secondhand aircraft sales park alongside Heron G-AXFH just returned from St Lucia where it had been damaged by a hurricane some time ago. Helicopters were much in evidence with the Aérospatiale Dauphin and Twin Squirrel attracting much interest on McAlpine's stand. A rather disappointing event if compared with those held in 1979 and 1981 and there must now be some doubt about the continuation of this show in 1985.

There was no problem of support for the Science Museum Open Day at Wroughton on 11 September, the hill-top airfield was absolutely besieged by the public making the most of the only opportunity this year to view the unique collection and supporting displays. The Science Museum formally took over the airfield and six hangars on 1 May 1980 and by this year had refurbished and occupied four of them with extensive displays of aircraft, lorries, cars, buses, agricultural equipment and other large items. Since last year three new aircraft have been acquired and a fourth has been refurbished and put on display for the first time. Fifty year-old DH Dragon G-ACIT was purchased at the Historic Aircraft Museum auction at Southend in May. It is the oldest surviving British airliner, having been delivered to Highland Airways in July 1933. Unfortunately the Science Museum was not able to get the Dragon into flying condition for its move to Wroughton and in transit by road it was damaged by an impatient driver squeezing his vehicle past. The repair is to be undertaken by Viv Bellamy and the possibility of getting the veteran airliner back into the air will be explored once again.

Representing the post-war trans-Atlantic airliners, Lockheed Constellation G-CONI is a welcome addition to the collection. Having lain derelict at Dublin as N7777G since 1974 it was purchased by Aces High in 1982 for use in a proposed tv series. This did not take place and it was offered for sale to the Science Museum. Originally it had been hoped to fly the L749 across from Ireland but this was abandoned earlier this year and it was dismantled and brought across by road/sea, arriving with much difficulty in August. At the Open Day it could be seen that work had commenced to re-assemble the 1947 airliner.

The third new aircraft is the Piaggio P166 G-APWY, presented by Marconi Avionics and flown to Wroughton from Southend on 1 June. Built in Italy in 1959 the twin engined aircraft had been used by Marconi for about 14 years, mainly to develop new designs for communications and radio navigational equipment. Brought out of storage and carefully restored, the Mignet Pou du Ciel G-AEHM was also on show for the first time. Other developments at Wroughton will include the refurbishing of the remaining two hangars and the assembly of all aviation exhibits in the two hangars (D3 & D4) on the north-west side of the airfield. The possibility of restoring Dakota EI-AYO to flying condition for the 50th anniversary of the first flight of the Douglas transport in 1985 is being actively investigated; EI-AYO is certainly the second oldest DC3 in existence and might well be the oldest. It should also be noted that both the Boeing 247D N18E and the Lockheed 10B Electra G-LIOA/N5171N have been kept in airworthy condition. The Science Museum hopes to open the collection on more occasions next year, with the major open day programmed for Sunday 9 September. Daily opening during summer months is still three or four years away however.

There are of course few events in Europe remaining to take place now that we are approaching the winter. The following brief list completes the diary for 1983 and includes the first couple of air events for 1984.

October

9 Duxford, Cambs; Power Sport '83 (Tel: 0223 833963)
9 Popham, near Winchester, Hants; Piper Rag'n Stick Fly-in (Tel: 025675 739)
16 Avignon, France; Aero Club Vaudusien Fly-in
23 Jambville, Yvelines, France; Essec Hot Air Balloon Meet
30 Old Warden, Beds; Shuttleworth Collection Informal End of Season Flying Occasion (Tel: 076727 288)

November

20 Trentham Gardens, Staffs; BBAC Montgolfier Anniversary Dinner — with hot air balloon flying on the evening before and the following morning, if weather permits (Tel: 0225 834686)

December

31-1 January Trier-Fohren, West Germany; Sylvester Treff aerobatic meeting
31-1 January Harrogate, Yorks; 4th Brass Monkey Hot Air Balloon Meet (Tel: 0225 834686)

January

7-8 Marsh Benham, Newbury, Berks; 12th Icicle Hot Air Balloon Meet (Tel: 0225 834686)

Readers are advised to check with the organisers that the above events are taking place before setting out to attend any of them.

Above: Final positioning of the Science Museum's Short Sandringham flying-boat in the new R. J. Mitchell Museum at Southampton. The aircraft has been repainted in the colours of Ansett Airlines of Australia and bears its former name *Beachcomber*. *Photo: Francois Prins*

Scottish visitors

Below: Lizard-camouflaged US C-5A, 76-8306, from the 60th MAW flew in to Prestwick on 20 August. The Galaxy transported DSRV 'Avalon' from San Diego for trials in the Firth of Clyde. The paint scheme carried by the C-5A is known as European One and will also be applied to the first C-5B scheduled to be delivered to the US Air Force in December 1985.

Below centre: Canadair Challenger HB-VFW (c/n 1049) of Zurich-based Swiss Air-Ambulance night-stopped at Glasgow at the end of August.

Bottom: On 3 September Aeroflot Ilyushin Il-76T, CCCP-76521, diverted in to Prestwick from Shannon. *All photos: R. Ellis*

Preservation view

The quarterly meeting of the British Aircraft Preservation Council was held at Bassingbourn on 20 August. Members were able to visit the East Anglian Aviation Society's premises some distance from the airfield where Rapide G-AJHO was seen to be progressing well on its restoration to flying condition. The target date for completion is the autumn of next year. News from member groups included the following: the Aeroplane Collection reported that work on restoration of the Airguard G-AFIN is proceeding well; Skeeter AOP12 is now back at Warmingham. The British Aerial Museum at Duxford reported that the Beech 18 is now painted in US Navy markings; the Auster AOP9 AR241 now has a Permit to Fly. The Chiltern Historical Aircraft Preservation Society has recently acquired Vampire T11 WZ550 which is now at Wycombe Park for restoration to static display and will be positioned at the entrance to the museum which is under construction for opening next spring.

The City of Norwich Aviation Museum, has now secured a four-acre permanent site and work is proceeding on the Herald G-AVEZ, Whirlwind XP355 and Sea Vixen XP919 to put them into display condition. Friends of the DC-3 are commencing preparations for the 50th anniversary year in 1985. Discussions are taking place with the Science Museum over plans to get Dakota EI-AYO, the oldest example of the type in Europe, airworthy for the celebrations. The Imperial War Museum at Duxford has received ex-Argentine Army Bell UH-1H AE-409 on long-term loan from the Museum of Army Flying at Middle Wallop. B-52D Superfortress 55-0677 is due to be flown in to Duxford during September, having been donated to the RAF by the USAF following the transfer of three Vulcans to USAF museums last year. The B-52 comes from the 7th Bomb Wing at Carswell AFB, Tx.

The Marine Aircraft Preservation Society has located an almost intact Sunderland III, believed to be ML883, and is continuing to make survey dives to investigate the wreckage. The Museum of Army Flying has recently acquired the Hafner Rotachute P5. Good progress has been made with the Museum Appeal — by the end of the year it is hoped that £250,000 will have been raised, with a similar sum required to reach the target by the end of the following year. The new Museum building will now be built alongside the A343 on the airfield rather than the previously planned extension of the present converted cinema.

The RAF Museum at Cosford took delivery of a second Pucara on 9 September when ZD485 was flown in from A&AEE Boscombe Down. The ex-Argentine aircraft had been flown for 25 hours for evaluation and test purposes but was grounded by the MoD on conclusion as no records were available on the aircraft's flying history. The RAF Museum is donating the remains of Spitfire V MK732 to the Dutch AF Museum. Parts of it have been used for the restoration of the Battle of Britain Flight's AB910. Spitfire G-AIDN/MT818 has not gone to the USA as was widely reported at the start of the year. Retoration work at St Athan stopped and the immaculate two-seater was packed up and removed to Graham Miller's premises at Dinas Powis where it has remained. Work has begun at St Athan on the major task of producing a Fairey Battle from the various components held by the RAF Museum. These come mainly from L5343 and P2183. Fiesler Storch VP546 is progressing well towards completion. Although it had originally been planned to make it airworthy, this is unfortunately not now possible. The restoration of Messerschmitt Bf109G RN228 is progressing well in the hands of Flt Lt Russ Snadden. Support has been obtained from a number of companies including British Aerospace, Rolls-Royce and

Dowty. The aircraft has recently been transferred from RAF Northolt to Benson. It is estimated that it will take about three more years to complete the project.

The Science Museum is to receive the last service Gnat, the RAE's XP505, following its retirement earlier this year from use at Bedford. It will be put on display at South Kensington next year. The Constellation G-CONI/N7777G arrived by road at Wroughton on 16 August and is being re-assembled by Aces High, Damaged Dragon G-ACIT is to be repaired by Viv Bellamy. The South Yorkshire Aviation Society has restored the SE5 replica BAPC176 to represent A4850 flown by Albert Ball VC. The Robertsbridge Aviation Society has received the remains of the Sea Tiger G-AIVW from Norman Jones. The Royal Aeronautical Society Medway Branch is assembling the Meteor F8 WK914 after restoration. Vampire T11 is to be moved shortly from Southend to the North Weald Restoration Flight. Paul Raymond has now revealed why he was collecting historic aircraft. On 1 August he opened the Whitehall Theatre of War at the former Whitehall Theatre in London. Exhibits on display include Spitfire 14 MV370, Hispano HA1112 G-BJZZ, Mustang G-BIXL, Storch D-EMKV and Sopwith Pup replica N6452/G-BIAT.

Turning now to some other items of preservation news. Cliff Lovell has kept up his excellent record of introducing rare, vintage US built aircraft to this country. On 15 August Waco UKC-S NC15214 arrived at Southampton Docks, in company with Cessna 140 N2440V. The Waco, a four-seat cabin biplane, powered by a 220hp R-670 radial, was re-assembled and flown before the end of August from his Kingsclere strip. Other recent work has included the restoration of Harvard G-BIWX, which has appeared as FT239, Caudron C270 G-BDFM and Pipistrelle G-AVKB. A major task on hand is the repair of Mew Gull G-AEXF, after it had been 'attacked' by Terrier G-ASKJ at Redhill in May. At Netheravon restored Tiger Moth G-AGZZ was flying in August and at nearby Upavon Auster 5C G-AKSZ also emerged from a long rebuild to get airborne again.

At a meeting on 20 August at the Grosvenor Hotel London big changes in the UK Wing of the Confederate Air Force were discussed by 17 of the 34 UK Wing members and adopted. The former Wing Leader John Allan was ousted and replaced by Col Peter Van Miers. Under the new leadership and staff officers the following decisions were taken: to establish a national HQ at Mersham, Kent; to divide the UK into two sectors — a northern Falcon Squadron led by Col Jim Keen and a southern Eagle Squadron led by Col Van Miers and to develop an ambitious forward looking programme. This development programme includes the acquisition and maintenance of CAF aircraft for the UK wing; to start a CAF heritage museum and in conjunction with Harlingen to plan for a major air show in 1985; the establishment of a European CAF headquarters at a former wartime airfield in the UK would be a longer term objective. To achieve many of the plans a considerable expansion of membership is also to be actively pursued. It remains to be seen whether the enthusiastic new CAF Wing will succeed where previous efforts in this country have failed.

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All hot air

This year is, of course, very important for ballooning, being the 200th anniversary of man's first flight in a balloon, which took place in France in 1783. This great achievement is being marked by special events all over the world, culminating in a commemoration in Paris on 20 November 'Montgolfier Day'. The first balloon was constructed by the Montgolfier brothers in 1783. This was a paper balloon 122ft in circumference and inflated with hot air. It rose to 1,000ft but quickly slid back to earth as the hot-air escaped. Soon afterwards Professor Charles, a physicist, used hydrogen to inflate a rubber coated balloon. This rose speedily into the clouds but fell outside of Paris, whereupon it was, according to reports 'attacked by peasants believing it to be the devil'.

Later in 1783 the Montgolfier brothers developed a waterproof linen balloon of 52,000cu ft which ascended at Versailles in the presence of Louis XVI. The first human ascent was on 15 October 1783 by Pilatre de Rozier but the balloon remained tethered. A few weeks later on 21 November, de Rozier and the Marquis d'Arlandes ascended in a Montgolfier balloon for the first free flight and travelled five miles across Paris at a height of 300ft.

Commemorative events began in the UK with the Bristol International Balloon Fiesta at Ashton Court on 12-14 August. More than 70 balloons and airships from many parts of the world took part, the overseas fliers coming to prepare for the World Championships later in the month. The farthest travellers being the Australians with Cameron N-77 'Red Rooster' and V-65 'Canowindra', neither of which carry registrations. The Hong Kong contingent included the Sam Miguel Brewery's Cameron Airship G-SMHK and balloon G-SMIG as well as Cathay Pacific's O-84 VR-HHO. A large representation from the USA ranged from the Cameron D96 Airship 'Benjamin Franklin' N1783J through an assortment of Barnes to decorous Raven 105 N1783TP. European visitors came from Italy (I-AIMO, I-TINY), France (F-GDZP), Belgium (OO-JOH), West Germany (D-LENOR II), Luxembourg (LX-HIT, LX-PIN) and Holland (PH-PMC). The remainder were British balloons including a number of new ones such as Barnes 77 G-BKOR, Thunder Ax6-56 G-BKUJ and Cameron N-77 G-BOOZ; the Colt Cloudship G-WZZZ mini-airship was much in evidence throughout the event.

This was followed a week later by the BBAC International Balloon Meet at Longleat House, Wilts. Many of the above craft moved on to what was the UK's biggest assembly this year of over 120 hot-air balloons. Although the weather was fine on the first day it deteriorated markedly over the weekend and virtually no flying could take place. The focus then shifted across the Channel to France where the 6th World Hot Air Balloon Championships took place from 26 August to 4 September at the Chateau de la Pervenchere near Nantes. Some 70 balloons took part in the competition and a further 50 or so additional craft joined in the fiesta flying at the opening weekend. Contestants came from the countries present at Bristol with the addition of Spain, Switzerland, Sweden, Finland, Austria, Denmark, Norway and Japan. Vishwa Bandhu Gupta brought his Raven Rx6 VT-EEI (ex-N8756L) from India to take part in the competition for the first time.

Although the weather was not ideal throughout the period of the World Championship meeting it did not prevent it from being completed in the time available. Overall winner was Australian Peter Vizzard flying Barnes F7B N3721Z 'Lovely Lady' with 7,726 points. Second was Olivier Roux-Devillas (France) in Thunder Ax6-56 F-GCZB 'Air France' with 7,184 points. The UK secured third place with David Bareford flying Camer G-BHNC 'Hot n'Cold' with 7,036 points. Nearly 100 balloons took part in the fiesta flying during the opening weekend 28-29 August but strong winds prevented this from being repeated the following week. There were a number of accidents during the 10 days resulting in injuries to pilots and crew, with one balloon, OY-BOP, being very badly damaged. Further events took place in France during early September including the Hotel Ibis Meet at the Chateau Vaux-le-Vicomte and an International Gas Balloon contest at Nesles-la-Vallee. During October and November further anniversary events were to be held including the World Gas Balloon Championships at Arc-et-Senans near Besancon from 1-9 October and a commemorative flight at the original site near Paris on 20-21 November. So 1983 will certainly be a memorable year for everyone interested in the beginnings of manned flight and the endeavours of those early pioneers. Two hundred years on ballooning has re-emerged as a significant feature of modern sport flying.

Left: Barnes F7B, N3721Z *Lovely Lady*, in which Peter Vizzard won the World Hot-Air Balloon Championships at Nantes.
Photo: Peter R. March

Right: Expansion Joint G-BIUL is in the foreground of this colourful mass ascent of balloons at the International Balloon Fiesta at Ashton Park on 12-14 August.
Photo: Andrew March

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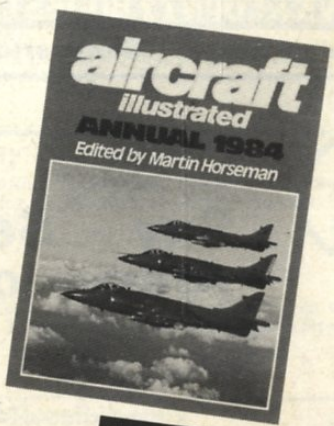

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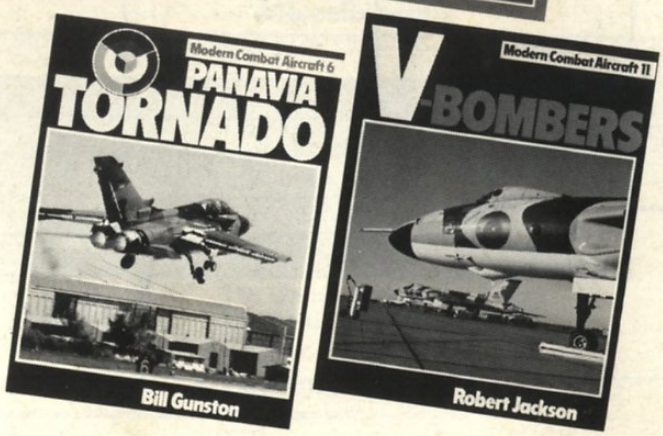

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